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GAS JOURNAL

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[Founded in 1849 as the "Journal of Gas Lighting."]

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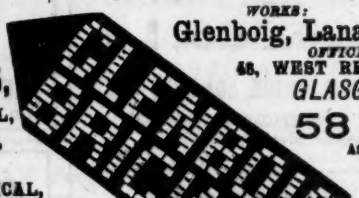

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EDITORIAL NOTES.

The Coal Crisis.

THE position of affairs in connection with the coal crisis has not improved with the passing days. Superficially, it looks much more serious. The acceptance as just and reasonable of the Miners' Federation claims by their partners in the Triple Alliance, and the attitude of the Trade Union Congress, stiffened the backs of the Miners' Federation. So last week closed with the hope crushed that events would during its course have cleared a way, or pointed the way, to a peaceful ending of the crisis created only by the Miners' Federation, and continued by consummate obstinacy or a refusal to look at their claims from the point of view of the mass of people in the country. But though the outlook is black at the moment, hope still exists that, from the places where commonsense survives in the labour world, something will emerge that will save industry from disaster, and a multitude of homes from privation—the homes of people whose custom creates employment for the miners. More optimistic folk are of opinion that, in view of the miners' leaders' repeated assertions that they do not want a strike (about which we have our doubts), their tactics are to hold-out to the eleventh hour in the endeavour to secure complete fulfilment of their plans for the disposal of the surplus profits on exported coal, and then to withdraw as best they can from a position that is untenable by reason. Not being in the confidence of the Federation, it is impossible to endorse this view of the optimists, nor to say there is no substantial ground for it. It is a mere supposition founded on the attitude of the Federation leaders in relation to the proposals of Sir Robert Horne at the conference at the Board of Trade last Thursday morning. These proposals have so much reasonableness about them that their unqualified and positive rejection have made the public still more suspicious of, and antagonistic to, the arrogant miners' leaders; for the rejection, if not part of a subtle game, shows completely that the leaders believe they are in a position now (which position they may never recover if allowed to slip) when the exercise of force will gain them ground in the realization of a good part of their policy.

This is the reason—there can be no other so far as we can see—why the miners' leaders refuse absolutely to resign their illegitimate claim for the reduction by 14s. 2d. per ton of the price of domestic coal. And they could not accept the other proposals without weakening their hold upon this one (which is the sheet-anchor to nationalization). No suggestion, however, escaped their lips that it was so. Though Mr. Smillie has said that the wage and price reduction claims are indivisible, every sane person knows that the indivisibility is only a matter of the wills of a few men who have been placed in a dominant position in the Federation, and from this position wield autocratic power. Words cannot obscure that fact. The correct payment of the miners is one question; the price reduction distinctly another. But the leaders gave an emphatic negative to the suggestion that their claim in respect of wages should be submitted to the arbitrament of a competent tribunal. This means that the miners' leaders are not prepared to have their claim reviewed by anybody; a claim from them is to be regarded, whatever other men may think, as an irrevocable and irreducible decision. Mr. Smillie trifled with the proposal. Asked by Sir Robert Horne whether he would fight rather than go to an impartial tribunal upon which the miners had representatives, the leader felt the weakness of his position, and could do nothing better than remark that he believed the Government had laid it down that there were to be no more increases of wages. To this Sir Robert gave a direct denial. The question remained unanswered by Mr. Smillie. There can be only one verdict upon this attitude, that the leaders are not confident—taking hours and output into account, and the total of the pay accretions since the war started—that they could before an impartial tribunal maintain the equity of their claim. If they felt they could, they would have no hesitation (unless another reason indicated above also animates them) in submitting their case to such a body. Their refusal is a sign of weakness; and the excuse for refusing—that they question the impartiality of the Industrial Court though a constituent part of it—is grotesquely feeble. Yet it is the strongest they had been able to fashion, though well aware that it would be put before them. Public opinion will have no hesitation in passing sound judgment.

Then again the leaders declined the third proposal, which was to the effect that the representatives of the Federation should meet the mine owners and discuss the question of a consolidated rate or rates of pay which should bear some relation to output. But the last thing desired by the miners is to regulate pay by output; notwithstanding that it is the most rational way to achieve a more permanent settlement of the coal difficulty. It would be one of the best means of reducing the cost of coal. But the miners' leaders prefer the present condition of things, as it provides them with scope for keeping matters as between the Government and the miners in a state of ebullition; and many of the miners themselves feel they are more comfortably circumstanced under the present arrangement in respect of payment for the quantity of work they do. The Federation also recognize that if payment were based on output, the share they at present possess (through counsel) in the control of output would be transferred to the miners, a large number of whom would be stimulated by the extra money they could earn, and the Federation would lose their present tight grip upon a very powerful weapon—a weapon with which they hope to guide the Government and the country to their own policy. That this is so, is evidenced by a remark by Mr. Smillie at the conference with Sir Robert Horne. In respect of output, there is a large unrealized potentiality in the coal industry. If production could be increased by 10 p.ct., it would mean another 24 million tons a year, which is the equivalent in tonnage of the coal now exported. But Mr. Smillie at the Conference said that the miners would be very chary about increasing the output by 10 or 15 million tons a year, if the profits from the increase were to be applied to paying off the war debt. This is one of the leaders who have been raving about reducing the cost of living, and who must know, if intelligence is not in a state of decay, that one of the best and most direct methods of reducing the cost of living is by lightening the national debt—not only by the profits on coal, but by the profits on increased production and trading in every industry. If the evidence thus given by Mr. Smillie of the measure of his patriotism could be taken to represent the value of that of men in all industries, then we should have very little hope for the future of this country. If Mr. Smillie does not want to take his proper part as an Englishman, then the quicker he transfers himself to a country where the conditions are more in consonance with his views, the better would it be for all concerned. At the same time we are not unmindful of the existence of many difficulties in basing pay upon the output of coal. But they are not insuperable to technical regulation. For example, thick seams of soft coal are easier to work than thin seams of hard coal. This and other matters could well be subject to differential rates of pay. It is all rubbish for Mr. Smillie and others to talk of nationalization being the one incentive to increased production. The seven-hour day was to have the same salutary effect. But the fact is plain that the real effect is an

unhealthy reduction of coal output. Payment by result, if we know anything at all of human nature, will do what nationalization cannot do. Mr. J. H. Thomas, in his Presidential Address to the Trade Union Congress, took a very gloomy view of the industrial outlook. What are the Miners' Federation, with their supporters of the Triple Alliance, doing towards improving the industrial outlook? It would be interesting to have the answer of Mr. Thomas to that one question.

It seems to be perfectly clear that the Miners' Federation leaders do not desire a reasonable settlement. At any rate, they will not take advantage of any machinery to achieve that end so far as wages are concerned. They want to put the country into chaos in the attempt to make nationalization a condition of settlement. We can arrive at no other conclusion; for they know very well that the profits the division of which is the excuse for a strike will rapidly vanish if the deluded miners cease work. They may hoodwink the Thomases and others; but they cannot hoodwink the general public, who can take an unbiassed view of what is passing. In the trade unions, there are a host of men who are convinced that there is no legitimate ground for a strike on the miners' claims, and who realize what a strike will mean in these times to them and to their dependants. After the encouragement that the miners got at the congress last week, it is time that the trade union members whose conviction and realization are as stated here moved themselves to let their "leaders" know that any encouragement they extended to the miners on this particular occasion is a misrepresentation of a not-to-be-ignored body of trade union opinion. The "leaders" were in this matter only speaking or acting for themselves, and not presenting the divergent views of members who are capable of thinking as well as the leaders, though the latter do not give any indication that they recognize that this is so. The next ten days will be momentous ones. Whatever happens, the country cannot allow Parliament to be superseded by trade unions.

A Word of Advice to Gas Stock and Share Holders.

FINANCIAL papers and stock market reports in other daily papers have been devoting more attention during the past week to gas stocks, which in some cases have shown a very decided, though naturally gradual, tendency to put on flesh in reference to market values. One reason for this is that Dr. Carpenter's statement to the proprietors of the South Metropolitan Gas Company (which was widely published throughout the country) emphasized the fact that the turning-point in the long lane of misfortune for gas stock and share holders was within reach. The South Metropolitan stock will be one of the first, through the new Act of the Company, to feel the effect in the way of improved dividends. People, too, are awakening to the facts that the general depression there has been over gas stocks has been lifted by the passing of the Gas Regulation Act, and that the Board of Trade will soon be earnestly and continuously considering the measure of change in existing statutory terms affecting standard and maximum gas charges and dividends of the other undertakings, and issuing the necessary constructive and modifying Orders. It is thus being much more generally realized that gas stocks and shares will, with higher dividends, be entitled to better market values, and will get them. Inquiry in the City last week showed that of some of the better-class gas stocks, in which there are as a rule free dealings, there was not much on offer; and in some, purchases could not be effected. There is therefore not much chance for the speculative person who is looking for a rise, nor for those stock and share holders who are anxious to bring down the average outlay on their holdings by fresh acquisition at a much lower rate than the premium-carrying prices they paid before the war. We are glad to find that the low price is acting as a deterrent to sale; for the existing holders will without any question make good, by retention, some substantial part of the depreciation they have suffered through war circumstances and the reluctance of Parliament, until recently, to help to a restoration to them of some of the lost value of their property by giving them earlier what they were justly entitled to—a dividend round about that which they were enjoying before the war.

Our advice to gas stock and share holders is not to part with their holdings at present prices, nor those to which stocks and shares may go through the demand there may be from those who know that under the new conditions present market value is not the intrinsic value. There may be some who may be tempted to part, after what has been experienced, on an early rise. To any who are contemplating this step, unless necessity compels, we say "Don't." The warning, however, should be given that it may be many a long year before the existing stocks and shares will be up again to pre-war values. It is no use being too optimistic—we prefer the pleasure of good news rather than to build too confidently upon an uncertainty, and then having to swallow disappointment. But market values are bound to appreciate, and to narrow the wide gap between present values and the values from which they so precipitately fell. The primary goal in appreciation of the present market prices will not be reached until there is an approach to the first announcement as to the dividend under the new order of things, and then as matters gradually improve, and the charge for gas falls below the standard price (when this will be is something that is not a likely immediate happening), there will be a further accretion of value. But we are not at this stage anticipating a realization of the market values that existed before the war. They may come in time; but they cannot do so while high rates of dividend and interest can be obtained at par value in most industries (gas undertakings themselves will have to pay more for new money), and this appears likely to be the case for some few years to come. However, there is not very much to be gained by speculating on the future. Our present sole object is to urge gas proprietors strongly not to be tempted to sacrifice their stocks and shares upon the first movements to better values. Directors of gas companies will do the right thing in taking every opportunity of widely spreading the advice to "Hold on" among those who have entrusted them with the administration of their gas interests.

Passing of the Old Gas Legislation.

FOR the gas industry, the session of Parliament this year will be especially memorable for two events—the enthronement of the Gas Regulation Act (giving the industry a new basis of working, trading, and charge, and fresh legislative facilities, for which it is profoundly grateful), and the South Metropolitan Gas Act. This latter creates a valuable precedent for which stock and share holders will be truly thankful, in that it inaugurates a new system of dealing with profits, by providing first of all a minimum dividend on the ordinary capital, and secondly by making the gas consumers, stockholders, and employee co-partners joint participants in surplus profits—the consumers taking the superior share, which, having in view stability and progress, is an act of wisdom on the part of the designers. Secondary to these pieces of distinctive and momentous legislative work, there were other Bills dealing with gas that passed through Parliament during the session; and in this issue we have begun our review of the changes made in them since they were lodged. In all probability, this is the last session in which we shall see Bills and Acts with, embodied in them, certain of the characteristics that these Acts contain. If the responsible men administering gas undertakings prefer this method of procedure, future Bills will contain the heat-unit basis of charging and other features covered by the Gas Regulation Act. But we opine that most promoters will take the easier and more certain route of proceeding to the Board of Trade in respect of all matters coming within the Act. Generally speaking, gas Bills in future will only deal with questions that are outside the functions of the Board—particularly in view of the fact that, in regard to various significant matters, the Board are the revising authority, and therefore it will be better for the Board to deal with them *ab initio*.

Therefore, it may be taken that this is the last time we shall be dealing with standard and maximum prices on the per 1000 c.ft. basis, and with standard calorific powers on the lately unalterable line of 500 B.Th.U., below which the Private Bill authorities (the arguments of science or economic expediency notwithstanding) could not, through a scrupulous adhesion to the model before them, allow themselves to depart. This sort of conduct is what has passed for prudent legislation and justice. Something of a more enlightened character is now to take its place; but this has only been achieved by discarding the old and setting-up the new basis of working. Standard and maximum prices per 1000 c.ft. give place now to standard and maximum prices per therm, and standard calorific values are to be superseded by the "declared" calorific values, which will be the standards until some further material advantage can

be secured by a fresh declared value upon which the ratifying seal of the Board of Trade is placed. From the Acts reviewed to-day, it will be seen that right up to the end the spirit and principles that the Government itself endorsed in the Gas Regulation Bill were shunned and unrecognized by the Private Bill authorities. For example, the Coventry Corporation Gas Department, with its tremendous industrial load, desired a standard calorific power of 450 B.Th.U. This desire was shown in the Bill. It was the calorific power that in their circumstances and experience is economically the one to which to work. But in the Act it is raised to 500 B.Th.U.! It would be interesting to have the opportunity of examining those who insisted upon this, to find out the reason for the change from the 450 B.Th.U. We are confident it would not be a scientific reason, and that the most they could do would be to take refuge behind the hard-to-move boulder of precedent. Such doings, which negative the rights of change and advance, are not legislation, though *pro formâ* they are so called. However, Coventry will be able to get this adjusted through the Board of Trade when applying for an Order in terms of the Gas Regulation Act, under which they must come within two years, or the Board will in all probability be making an Order without having any formal application.

The same applies to several printed pages of legislative matter that are in the Acts before us. Much will have to be scrapped almost immediately, and new ordinances be established in respect of calorific power, pressure, standard prices, and so forth. It will be seen from the review that the old order of maximum prices has undergone change. The authorities concerned could not, with material facts that they could appreciate before them, deny a substantial upward movement; and the same applies to the increased charges sought and allowed in certain cases for prepayment meters. That there should have been this relaxation from rule is something that is truly noteworthy.

Proper Application of Surplus Municipal Gas Profits.

IT is as vicious a proceeding in connection with public services, to make the consumer pay higher prices than are necessary in order to have balances to transfer in aid of the rates, as it is to subsidize such trading services from the rates through not charging an economic price for the commodities or accommodation. If there are surpluses after all obligations and prudent provision have been satisfied, then the benefit of them should inure directly to the consumers either through a reduction of price, or by devoting the money to improving or financing the service in some way. There has been approval of this on the part of Parliament in several ways lately. The Government have discarded subsidies as altogether economically noxious and unsound. In making temporary increases of charges in connection with statutory concerns—not only gas but other trading—it has been a rule not to allow a revision of prices on a scale that would permit, in the case of local authority undertakings, surpluses to be made which could be passed over to the credit of the rates, so putting a super-tax upon the customers the aggregate of which ought to be spread over the whole of the ratepayers. In the reports on the reorganization of electricity generation, and in the Electric Supply Bill of this session, the principle is recognized that surpluses, after meeting all obligations, should inure in some manner to the benefit of electricity consumers. The Coventry Corporation Act contains a voluntary clause which confers power to give effect to this principle in the case of both the gas and electricity undertakings; but we should have been better pleased to have seen it made obligatory instead of permissive. It decrees that the Corporation may, if they think fit—instead of carrying the net surplus remaining in any year of the gas or electricity revenues received by them, and the annual proceeds of the respective reserve funds of the undertakings when amounting to the prescribed limit, to the credit of the general district rate—apply the whole or any portion thereof to the purposes of the gas or the electricity undertaking respectively, including the formation of a fund for working capital, provided that the fund so formed shall not at any time exceed a sum equivalent to one-half of the then current gross annual revenue of the undertaking. In view of the high cost of money and of stocks and stores, the utilization of surplus profits (assuming a reasonable price is being charged for gas) for the provision of working capital is a politic measure, which should redound to the financial benefit of the undertaking, and therefore to the consumer, through the advantageous effect it is bound to have upon the price of gas.

Self-Determination or Dictation.

THE theories and policies of the advanced leaders of trade unions appear to be the subject of acceptance or abandonment according to the elastic test of whether or not it suits them and the interests they are supposed to serve. Their self-made laws and principles are only binding subject to their wills, and not those of other people. They rave at the Government over Russia and utter the most earnest imprecations upon those in this country who, they fancy, have some idea of interfering with the affairs of the Bolshevists. Their ravings are provoked, and their utterances fashioned, because of their protestations of a profound belief in self-determination. They form a Council of Action, and deny the right of their fellow-countrymen to determine what shall or what shall not be the policy in this one particular of the Government they have been instrumental in electing, while the Government aver that they were not contemplating the policy against which there was this futile show of resistance. There is no need, nor is it our wish, to discuss this aspect of the matter. Self-determination in Russia, however, is one thing; self-determination at home is quite another. The principle is allowed to fit only where the advanced trade unionists think proper. Interference in politics is not a legitimate function of trade unions; but many of the trade union leaders of these times have no intention of confining themselves to legitimate objects, nor of allowing their fellows equal political rights and influence with themselves. If they would form a composite Council of Action representing employers and employees to promote the welfare of the country's industry and trade, they would be doing something beneficial in the world. But this seems to be just what they do not want to do. On the contrary, while they are busy on the one hand watching that the Government of the country does nothing to intrude upon the high principle of self-determination in Russia, they have much of the rest of their time occupied in attempting to prevent this country through the Government determining certain internal matters, and in taking the part of dictators, which they believe admirably suits them, though opposed to the sanctity of the principle of self-determination by the people generally.

Though coal is still under Government control, the Miners' Federation claim that they have the right to usurp from the representatives of the community the power to determine both selling price and the manner of disposal of surplus profits, from whatever source derived. Mr. Frank Hodges, the Secretary of the Federation, says the Government are not entitled to have the surplus profits obtained from exported coal in the Exchequer, where it benefits the whole community, but that the miners have the right to dictate (though they have had no part in realizing the high prices for coal sold for overseas use) its division between the miners and the domestic consumers of coal, while denying the right of industry to any participation in the lower prices, including (we take it) gas, electricity, water, railway, and other public services. This is a direct challenge to self-determination in this country. The Miners' Federation have a perfect right to suggest; it is for the people of the country to determine policy, and whether suggestions shall be accepted, through those they appoint for the purpose, and not through the men the miners appoint to look after their interests as colliery workers. Put another way, the self-determination that the extremist trade union leaders claim for Russia and other countries, they would like to refuse the people of this country. Determination is to rest with them not only in the matter of coal prices, but in that of nationalization, to which the price of coal question has been attached in a manner that makes the two subjects indivisible. Nationalization, again, is a question for the nation to determine, and not the Miners' Federation.

Another illustration is supplied by the unemployment creating electrical dispute. Employers providing the means for establishing work and promoting employment are not, according to modern trade union policy, to be allowed to determine whom they shall employ as foremen in charge of members of the Electrical Trades Union. The masters very properly refuse to be bound in that way. They claim self-determination—the right to engage the men best qualified for the work, whether or not they are members of the Union. It is on this intolerable claim and attempted dicta-

tion that the Engineering Employers' Federation have taken the step of locking out the members of the Union; and work in the engineering trade will in consequence largely suffer through the obstinacy of the Union in persisting in their claim to dictate to the employers. What the Union should do is to find the capital, establish works themselves, employ all trade unionists, and use their own brains in developing the technical and commercial sides of the business, and let the employers' works remain unproductive. This course does not, however, appeal to them. Their imagination rises no higher than an appeal to force. There is now the very senseless threat to bring pressure to bear on the foreman question situation by depriving of a supply of electricity the tubes, the trams, and the domestic and industrial users in the Metropolis. These are examples of how some of the Unions demonstrate the right to freedom of a country and its peoples on a democratic basis. Freedom as they define it is wonderfully one-sided.

The "Betrayal."

A gas shareholder (one of a family of investors in gas undertakings) writes bitterly in our "Correspondence" columns of what he considers has been a gross betrayal of the interests of existing shareholders through a 5 p.ct. dividend being placed on old ordinary capital, and 6 p.ct. on new ordinary. The tenor of his letter seems to indicate that "One of the Betrayed" (for so he signs himself) thinks that the differentiation named between the dividend on the old ordinary capital and on the new will apply to all gas companies. No one at present knows whether or not it will be so. The distinction to-day only finds representation in the Act of the South Metropolitan Gas Company; and it is impossible to say what will be the decision of the Board of Trade in respect of the applications for Orders that will come before them under the Gas Regulation Act. This Act has nothing to do with that of the South Metropolitan Company, nor with the decision as to dividends that finds expression in it. The indications, however, are [as pointed out in the "JOURNAL" for Aug. 25, p. 384] that the Board of Trade will, under the General Act, restore in the Orders they make the pre-war dividend, and grant terms as to price that will enable the sliding-scale to operate from that dividend as formerly. As to the inadequacy and unfairness of 5 p.ct., in view of what gas shareholders have lost through no fault of the management of their interests, but entirely owing to the war and changed economic conditions, we are at one with our correspondent. This is a point which has been discussed by us on several occasions—one of them being June 1 [p. 476]. But it must not be overlooked that the 5 p.ct. in the case of the South Metropolitan Company is a minimum dividend, and it displaces a 4 p.ct. standard dividend, which supplied no security under war or other abnormal conditions. As to the 6 p.ct. new ordinary capital, we are afraid that this will not for some time be regarded as very attractive by investors, unless something fairly definite can be advanced as to the percentage increasing under the influence of decreased gas charges. The immediate prospect of this is not very brilliant. Therefore (for how long it is not yet possible to say) the financing of gas undertakings will have to be by redeemable debenture or preference stocks. In present circumstances (to which we must shape our views) this cannot be helped.

Unfairly Directed Censure.

Our correspondent appears to be more than a little hard on gas administrators in connection with what has happened; and we are afraid he speaks without having been behind the scenes. Much of his letter should have been addressed to Parliament—not to gas administrators or to Dr. Carpenter. But this we do know, that the Chairman of the South Metropolitan Company and his colleagues struggled hard, and took to Westminster the best financial talent to support their case in favour of a 6 p.ct. minimum for the old stockholders. But though they proposed, the decision was in the hands of Parliament; and the Directors had to choose whether they should accept the decision of a House of Lords Committee, or sacrifice the new scheme which they had submitted to Parliament. Whether they were right or wrong in their choice is entirely a matter between them and the South Metropolitan proprietors. In this instance, as in connection with the Gas Regulation Act, there has been no dereliction of duty on the part of the responsible gas administrators. Theirs has been a time of deep anxiety and hard work; and the stubbornness and ignorance they have had to contend with have been of colossal order—not at the Board of Trade, but in Parliament and outside. The measure of success is not in this case the measure of effort for the realization of something better; and blame for realization falling short of the goal sought must be placed elsewhere than on the shoulders of those who have worked for the industry. We are afraid that to have asked for something more than one expected to get, in the hope of obtaining better terms, is a trick that even a House of Lords Committee would have seen through, and is not one that the Board of the South Metropolitan Company could have asked the eminent financiers who came to their assistance to support.

Coal Prices and Exported Metallurgical Coke.

The first directions issued under the Mining Industry Act places the maximum pithead prices for home consumed coal on the same basis as fixed under the Pit's Mouth Prices Order, dated May 10. Owing to the complaints made as to the inadequacy of the supply of washed coal, and with a view to securing its greater output, an increase not exceeding 2s. 6d. per ton in the price chargeable has been allowed. Coal for the manufacture of patent fuel or of metallurgical coke for export has been excluded from the benefit of the limited price under these directions, and is to be the price of such coal if sold for export.

Mining Industry Advisory Committee.

Under the Mining Industry Act, the Board of Trade are to refer to an Advisory Committee for advice any question concerning the powers and duties of the Board relating to mines and the mining industry which appears to the Board of such a nature as to make such reference desirable, and they are to take into consideration any representations thereon which shall be made by the Committee. The Advisory Committee is to consist of a chairman and twenty-four other persons, three of whom are to be "representatives of employers in other industries." As the gas industry has dealings with the coal industry to the extent of about 20 million tons a year, and is a constant customer, one of the three representatives of "employers in other industries" ought to be drawn from the gas industry. Another reasonable ground for such a claim is that the provisions of section 3 of the Ministry of Mines Act which relates to the export of coal also applies to "coke, briquettes, and other solid fuel of which coal or coke is a constituent, in like manner as they apply to coal." Another point in the Act is that from Wednesday, Sept. 1, the Price of Coal (Limitation) Act of 1915 was repealed; but for a period of one year from that date the Board of Trade "shall" from time to time give directions for regulating the pithead price to be charged for coal sold for consumption in the British Isles, and for coal sold for the bunkering of vessels other than those proceeding to ports outside the British Isles.

Coal Refuse and Production Returns.

The gas industry has suffered intensely from the large proportion of refuse there has been in the coal supplied to it during the last few years. From the Memorandum on Coal-Mining Statistics presented by Prof. Henry Louis as an appendix to the third report of the Committee on Fuel Economy as submitted at the recent meeting of the British Association, it appears that while Canada, the United States, France, and Belgium are all aiming at one definite meaning for the word "production" in relation to coal, in this country there is a considerable amount of looseness as to the nature of the material returned as coal. It is "supposed" that the weight only of the coal is returned. But the instructions in this connection that have been issued by the Home Office are indeed very vague, and have large gaps in them which allow of the character of the material returned being anything but what can honestly be characterized as coal. It is stated that the weight given "should be" the net weight after screening and sorting. Where, however, "the net weight of the coal is not determined during the year in respect of which the return is being made, it will be sufficient if a deduction is made according to the average percentage of dirt extracted from the coal of the mine. In cases where the coal is sold as it leaves the pit without screening or sorting, it will be proper to give the gross weight sent out of the pit as the amount of output." It is seen

that Prof. Louis is anything but enamoured of the considerable openings that these instructions leave for guesswork and estimates, instead of accurate facts.

Useful Work for the Fuel Economy Committee.

The Fuel Economy Committee of the British Association should devote time and attention to the percentage of inert substances there has been and is in coal—running in some cases to 20 to 25 p.ct. beyond the pre-war ash content of the coal. Many gas undertakings could supply the Committee with considerable information on this subject, and so could most other industries. This useless stuff has to be paid for as coal; and it spreads uneconomy over the country through its transport, and through all manufacturing operations owing to its influence in lowering efficiency and increasing labour in dealing with it from its reception to the removal of the ash and clinker. To work with the view of altering this condition of affairs would be a healthy job for the Fuel Economy Committee to take up; and, if successful in realizing the proper cleansing of coal before despatch, they would be justifying both their existence and title. There would be more practical advantage in this than in attempting to saddle the gas industry with fresh legislative restrictions, for which experience gives no warrant. Now that a change is, under the Mining Industry Act, to be made in the regulation of the coal industry, perhaps something really good could be done by the Committee in regard to inerts in coal.

PERSONAL.

Mr. T. DUXBURY has accepted the mayoralty of Darwen (where he was formerly the Corporation Gas Engineer), in succession to Mr. Holgate. The new Mayor belongs to an old Darwen family, and was at one time Gas Engineer at Accrington. He entered the Darwen Town Council in 1905 as an independent. He is an associate member of the Institution of Civil Engineers, a fellow of the Chemical Society, and an honorary member of the Institution of Gas Engineers.

The first prize and silver medal in the last City and Guilds of London Examination in "Gas Engineering," final grade, went to Mr. E. C. NASH, one of the engineering assistants at the Vauxhall works of the South Metropolitan Gas Company.

Prof. JOHN BRETLAND FARMER, D.Sc., M.A., F.R.S., of the Imperial College of Science and Technology, has been appointed a member of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research.

OBITUARY.

A well-known Parliamentary Agent passed away last week, at the age of 72, in the person of Mr. W. A. SHARPE, of the firm of Sharpe, Pritchard, & Co. He was late President of the Law Society.

Eastern Counties Gas Managers' Association.

A full programme of debate has been arranged for the autumn meeting of the Association, which is to be held in the Hamilton Reception Room, Abercorn Rooms, Liverpool Street Hotel, at 2 p.m. on Thursday, Oct. 7. Following upon the induction into the chair of the new President (Mr. A. W. Sumner, of Grays), there will be a discussion on "Distribution Problems of To-Day," the subjects to be introduced being: (1) "Meters—Hire Rates, Repairs, and Depreciation," to be started by Mr. J. W. Auchterlonie, of Cambridge. (2) "What Free Work Should be Done for Consumers, and What Should be Charged For," also "Maintenance Work for Consumers," by Mr. Thomas Glover, of Norwich. (3) "High and Low Pressure Systems," also "Boosting," by Mr. Frank Prentice, of Ipswich. (4) "Gas Supplies in Connection with the Housing Schemes," by Mr. John Terrace, of the South Suburban Gas Company. (5) "Show-Room Arrangement and Practice," by Mr. E. F. Keable, of Gorleston. Other subjects suggested are: (1) "Cookers—Hire Rates, Hire-Purchase, or Sale; Repairs and Depreciation." (2) "Advisability of Hiring Gas-Fires, Geysers, Water Heaters, Shop Lamps, &c." (3) "Specification for Sizes of Services and Internal Piping of Houses."

Temporary Increase of Charges Act.—The Ministry of Health have made Orders, under the Statutory Undertakings (Temporary Increase of Charges) Act, authorizing the Coalville Urban District Council to increase the maximum price of gas from 5s. 6d. (under a previous Order) to 6s. 3d. per 1000 c.ft.; the Doncaster Corporation, from 4s. 6d. (under a previous Order) to 5s. 3d. per 1000 c.ft.; the Neath Corporation, from 5s. 6d. to 6s. 6d. per 1000 c.ft.; and the Silsden Urban District Council, from 5s. 6d. (under a previous Order) to 6s. 6d.

GAS ACTS FOR 1920.

[FIRST ARTICLE.]

IF we limit the review of the Gas Acts passed in the present session of Parliament to a notification of the changes that were made during the progress of the Bills, leaving those who are interested to consult for other points the digest of the measures as lodged, and as published in the early numbers of the "JOURNAL" this year, the task should be a comparatively light one. We will deal with the Acts in this manner in their alphabetical order.

The clauses in the BLACKPOOL CORPORATION Improvement Bill referring to the incorporation in the borough of the urban district of Thornton are not included in the Act, and so the provisions as to the gas undertaking in the area have also disappeared. [*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

All the powers, save one, applied for by the BRIGHTON AND HOVE GAS COMPANY were secured. The exception is constituted of the provisions referring to the raising of the standard price of gas, and the prices in the outer areas and to prepayment meter consumers. But towards the end of the Act there is the clause: "Nothing in this Act shall exempt the Company or their undertaking from the provisions of any General Act relating to the supply of gas which may be passed in this or any future session of Parliament." The revision of prices will therefore come before the Board of Trade, when the Company make application under the Gas Regulation Act. There are clauses for the protection of the Brighton and Hove Corporations in respect of the carrying out of works in the streets, roads, or upon bridges. [*Parliamentary Agents: Messrs. Sherwood & Co.*]

The COVENTRY CORPORATION have obtained the powers they required in connection with the extension of their gas-works at Foleshill. But they have not been allowed the standard calorific value of 450 B.Th.U. which was sought; but the sticklers for precedent placed them on the 500 B.Th.U. basis. However, this is a matter the Board of Trade will in due season be able to adjust under the Gas Regulation Act, as they will also do the pressure clause, which prescribes a minimum of 15·10ths. The borrowing power required for the gas lands (£1800) has been allowed; the repayment period being sixty years. For the erection of buildings and plant for gas-works purposes, £250,000 is granted; but the period of repayment is placed at thirty years, instead of the forty years desired. It is as well, in the circumstances of the times, that the Corporation should have secured the power, if they think fit to use it, to apply—instead of carrying the net surplus remaining in any year of the revenue received by them in respect of their gas and electricity undertakings, and the annual proceeds of the respective reserve funds of those undertakings when amounting to the prescribed limit, to the credit of the general district rate—the whole or any portion thereof to any of the purposes of their gas or electricity undertakings, including the formation of a fund for working capital, provided that the fund so formed shall not at any time exceed a sum equivalent to one-half of the gross annual revenue of the gas and electricity undertakings for the time being. [*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

The interest of our readers in the Bill of the GREAT NORTHERN RAILWAY COMPANY was centred in a clause which provoked much hostility, and which proposed to authorize the Company to purchase gas, electricity, and water where they pleased, and carry it where they liked for use at any part of their system. Gas and electricity were withdrawn from the clause and water remained; and this may form a precedent which some day there may be an attempt to apply by some company to gas and electricity. Therefore, it may be well, while the Act is at hand, to reproduce the clause as endorsed by Parliament:

52. (1) Notwithstanding anything contained in any Act or Provisional Order, any local authority, company, body, or person supplying water under statutory authority may, within their limits of supply, supply water to the company for use beyond such limits, and the company may take and convey along and use on, and for the purposes of, any portion of their railway, whether within or beyond such limits, any water so supplied to them.

Provided that if the said portion of railway where such water is proposed to be used be within the limits of supply of any other local authority, company, body, or person supplying water under statutory authority, the foregoing powers of this section shall not be exercised except:

(*a*) With the consent in writing of such last-mentioned local authority, company, body, or person; or

(*b*) Under the authority of an Order of the Minister of Health which Order the said Minister is hereby empowered to make if and for such period as he is satisfied that such local authority, company, body, or person as last aforesaid are not willing and able to give such quantity of water as is required by the company for use within the limits of supply of the said last-mentioned local authority, company, body, or person.

(2) Nothing in this section shall extend any obligation of any local authority, company, body, or person to supply water under any Act agreement or otherwise.

(3) The company may lay down, place, and construct upon any part of their railway, mains and pipes for, or in connection with, the taking, conveyance, and user of water under the powers of this section.

(4) The powers of this section shall be in addition to, and not in

derogation of, any existing rights and powers of the company in relation to the taking and user of water.

There are no other clauses calling for notice. [*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

The HALIFAX CORPORATION Act is an abbreviation of the Bill. The clauses referring to the extension of the borough have been excised; and so there will be no gas or other property to take over in the proposed extended area as originally contemplated. The Corporation have been allowed to increase their maximum charge for gas to 6s. per 1000 c.ft. There are no changes in the gas clauses, which are of quite ordinary character. [*Parliamentary Agents: Messrs. Lewin, Gregory, & Anderson.*]

The MAIDENHEAD GAS COMPANY have been authorized to purchase between 3 and 4 acres of land in the parish of Taplow; but the Act shows an extension from the original Bill in favour of Lord Desborough—the new clauses fencing and hedging about the new land in a manner which considerably curtails its beneficial use. The clauses provide for the resale of the land to the owner, if the Company cease to use it or discontinue their works at Maidenhead. Along the boundary of one part of the land a cleft oak fence, 6 ft. high, is provided for, with also open fences or railings. Between the low open fence and the cleft oak fence, trees or shrubs are to be planted. A specified piece of the land is only to be used as a flower, fruit, or vegetable garden. Gas is not to be manufactured or stored on the land, nor are the Company to erect or use on the land any purifying plant other than such as shall be of the best-known construction for the time being for avoiding nuisance. No building is to be erected that exceeds 24 ft. in height to the eaves, nor is any building or structure of an unsightly character to be erected. If the site of the manager's present house is to be used as a coal-store, the Company are to roof-over such store, and take all possible precautions for preventing coal dust from being blown therefrom. [*Parliamentary Agents: Messrs. Sherwood & Co.*]

The MASHAM DISTRICT COUNCIL are to become the owners of the gas and electricity undertakings on Sept. 30. The works of the Gas Company change hands for £800, and those of the Electricity Company for £2600. The Council are allowed for gas a 6s. maximum price; and the extra charges for prepayment meter supplies are put at 1s. per 1000 c.ft., to include hire of meter and fittings, and 1s. 6d. if a cooking-stove is installed. For a meter without fittings, the maximum charge for hire is to be 8d., or 10 p.ct. on cost. While the minimum pressure is put at 15-10ths at the main, all gas supplied to the North-Eastern Railway Company is to be sent out at a pressure of 20-10ths at the inlet of the primary meter or meters registering a supply to the Company. The standard calorific power is placed at 500 B.Th.U. But this as other clauses are of normal character. The North Riding County Council and the North-Eastern Railway Company have increased the volume of the measure with protective clauses. For the money required for the purchase of the gas-works, a repayment period of thirty years is allowed, instead of thirty-five years; and thirty years is the repayment period fixed for the purchase money of the electricity undertaking. Borrowed working capital is to be repaid in ten years. [*Parliamentary Agents: Messrs. Baker & Sons.*]

The NEWTOWNARDS DISTRICT COUNCIL asked in their Bill for a maximum charge for gas of 8s.4d. per 1000 c.ft. We see nothing about this in the Act; so it would appear the matter will be dealt with under the Gas Regulation Act. The Council have the right to charge prices varying according to the purpose for which the gas is to be used. We pointed out when reviewing the Bill that the Council were proposing to saddle themselves with a calorific standard of 540 B.Th.U.; but we observe that this has been reduced to 500 B.Th.U. The minimum pressure of 15-10ths has had an exception tacked on to it in favour of the Belfast and County Down Railway Company, who are to be supplied at not less than 20-10ths at the inlet of their primary meter or meters. A provision appears in the Act providing (if required and necessary) for revision of the calorific power and pressure at intervals of five years upon application to the Board of Trade. Among other clauses, it is seen that any person who, without the express authority of the Council, lights any street lamp or turns on the gas shall be guilty of an offence, and be liable to a penalty not exceeding 40s. The borrowing power sought (£50,000) has been reduced to £36,700; and the period for its repayment has been lowered from thirty-five to thirty years. [*Parliamentary Agents: Messrs. Martin & Co.*]

The PONTYPRIDD DISTRICT COUNCIL have obtained the borrowing powers sought (£25,000) for gas mains, plant, and other purposes, and the repayment period is thirty years. The maximum price of 5s. 6d. named in the Bill is allowed. The purchase and use of coke-oven gas is provided for. Power gas clauses are also included. The other gas authorization is of the usual character. [*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

By the REDCAR ACT, the agreement entered into by the District Council and the Redcar, Coatham, Marske, and Saltburn Gas Company, for the transfer of the undertaking of the latter has been endorsed by Parliament. The terms of the transfer were set out in our issue for Jan. 13 last, when reviewing the Bill. Protection clauses for the North-Eastern Railway Company and the North Riding of Yorkshire County Council have been inserted in the measure. The provisions to which we referred in the "JOURNAL" named remain practically unaltered, including the standard calorific power of 500 B.Th.U., and the pressure of 15-10ths. But the North-Eastern Railway Company have secured the addition of a provision of an unusual order with reference to the 20-10ths pressure. It reads: "Provided that from and after the installation by the North-Eastern Railway Company of a system of inverted burners on their premises in the limits of supply, and so long as such burners shall remain in use, and that so much of the service-pipe between the main and the meter as is under the control of the said Company shall be of such a size as the Council would under sub-section (1) of section 14 of the Act of 1913 specify in the case of a new service-pipe for a similar supply, all gas supply by the Council to the said Company shall be supplied at such pressure as to balance a column of water not less than 20-10ths of an inch in height at the inlet of the primary meter or meters registering the supply to such Company." The maximum prepayment hire charge for meter and fittings is put at 1s. 3d. per 1000 c.ft.; and if a cooker is included, 1s. 6d. For a meter alone, 6d. per 1000 c.ft. is specified. The price of gas clause enacts:

(1) The price to be charged by the Council for gas supplied by them to persons who shall burn the same by meter shall not at any time exceed the sum of 5s. per 1000 c.ft. of gas, or such higher price per 1000 c.ft. as may be approved by the Ministry of Health, and as will not be more than sufficient as far as can be estimated, before the commencement of the period for which the charge is made, to enable the gas undertaking to be carried on without loss during that period.

(2) Notwithstanding anything contained in this Act or in the Acts incorporated therewith, if at any time the price charged by the Council for gas supplied by them within the district to persons who shall burn the same by meter shall be less than 3s. 4d. per 1000 c.ft., the price to be charged by the Council for gas so supplied beyond the district may exceed the price for the time being charged within the district by 1d. per 1000 c.ft.

The Ministry of Health mentioned in the foregoing will now be the Board of Trade. The power to purchase crude or partially purified gas is allowed. The borrowing powers referred to in our review of the Bill have all been granted, together with the prepayment periods named. [*Parliamentary Agents: Messrs. Torr, Durnford, & Co.*]

The RISCA DISTRICT COUNCIL have secured the right to a maximum price of 7s., as desired, together with other clauses that are general in modern gas legislation. [*Parliamentary Agents: Messrs. Lees & Co.*]

ELECTRICITY SUPPLY MEMORANDA.

THE special contributor of "Cooking and Heating Notes" to the "Electrical Times" does not think much of the specification of the British Standards Committee for the standardizing of electric-cookers. So far as can be seen, he has some adverse criticism to make on it in respect of almost every detail. If a really satisfactory and reliable electric-cooker is realizable—a cooker which will bake, boil, and grill satisfactorily, so as to be a delight, and not a worry and abominable expense, to the user—then, with all the brains, time, and money that have been expended in the effort to achieve success, such cookers ought to be here to-day. But electric-cookers that are satisfactory, economical in time and money, and reliable are not existent. Were there such cookers, then there would be a standard which should be followed. But here we have the British Standards Committee, with available all the experience of makers over the last thirty years (thirty years be it marked! and yet the electric-cooker has not yet attained popularity), preparing a specification which the first real critic who comes along tears into shreds, preserving out of the whole of the points only one or two as being worthy of acceptance. On the design of an electric-cooker opinions have always differed; and the standard specification has only introduced yet another opinion with which other experts are in disagreement. We can imagine the writer in our contemporary with his tongue in his cheek as he penned the words, "satisfactory and reliable as are most of the present electric domestic cookers," and then can see him withdrawing it as he added for safety the truth "nobody will deny that there is still much room for improvement, and changes in design and application are of frequent occurrence." This is an interesting admission, after the great number of years during which electric-cookers have been under construction and scrapping. Any intelligent man or woman reading the statement will ask, Why are changes in design and application of frequent occurrence? And the answer will be, "Because satisfaction, economy, and reliability have not yet been attained." They will also ask, Why is a standard specification necessary—a specification which according to this writer is full of defect? The same answer will be given; and the wise householder will prefer to wait until he has more confidence in the sufficiency and efficiency of electric-cookers for all purposes in respect of time, current consumption, reliability, and pocket economy.

Searching for a Satisfactory Electric-Cooker.

The Specification Criticized.

The problem of the electric-cooker is a complex one; and, as the history of electrical endeavour proves, one that is not easy of solution. The gas-oven (internally or externally heated) and top-plate is something that is simple in design, economical in use, reliable, and relatively cheap in first

cost, installation, and running. Even to-day our candid contemporary says "he would be a bold man indeed who would dogmatize on even the present form of cooker being the eventual universal popular type, but to standardize down to details in the present form is indeed jumping at conclusions." Then he pounces upon the specification. On certain points, it does not even standardize on the latest practice. "Details of construction are standardized which are known to have caused trouble in the past, which trouble has been overcome by more up-to-date methods. Certain it is that, if the specification be adopted by the larger buyers as it stands, progress will be stultified, and the general public adoption of electric cooking delayed." What has delayed the general public adoption of electric cooking up to this point? The reply is found in the already quoted words of the writer: "Nobody will deny there is still much room for improvement; and changes in design and application are of very frequent occurrence." We need not touch on all the points raised by the specification critic. But it is seen that he approves of a separate cable socket for the purpose of earthing the range. This he thinks is an improvement which all manufacturers would do well to adopt. He gives a very good reason for taking every precaution possible. "A case of shock to a cook or user of an electric-range will," he says, "neutralize much earnest development work, as any central station man well knows." He objects to the height of the cooking range being 39 in.; and he does not like the dimensions of the oven being specified, as different districts call for different sizes of oven space. He sees no need for specifying the actual position of the elements. The provision of a thermometer he looks upon as a refinement. The prescription as to the time taken to raise temperature in the oven is criticized. For instance, for an oven 18 in. by 13 in. by 14 in., with a loading not exceeding 2000 watts, the temperature must rise to 350° above room temperature in 35 minutes. Our friend rightly thinks that this would be a sore trial to the patience of the cook. The specification for the top plate, or cooking-table portion, is also the subject of animadversion; and the writer is strongly impressed with the righteousness of electric-cooker victims in complaining about the slow "speed" of electric boiling from cold. He would like the speed increased, even at the expense of efficiency. When the specification comes to be revised, he believes that, if it rules-out all apparatus falling below a given standard in speed and efficiency, it will be a tremendous help to the popularizing of electric cooking. Practical experience tells us that electric cooking requires every shred of help that can be given to it, if it is to become really "popular."

Street Lighting Competition at Hove.

There has been a street-lighting competition between the Brighton and Hove Gas Company and the Hove Corporation Electricity Department; and needless to say the Corporation Committee who had the matter in hand have decided that the merit is on the side of their own commodity. They could hardly have come to any other decision without doing the Electricity Department and its deficits further damage; and, from their point of view, to do such a thing as that would have been highly impolitic. We remember that the incandescent gas lighting at Hove was before the war the admiration of many people who knew well the South Coast seaside resorts, and the lighting was a delightful experience compared with the stolid looking arc lamps of the Brighton Corporation. Through lack of complete information, it is a little difficult to interpret the printed pages of the official report which lead to the pious opinion that the advantage for public lighting lies on the side of electricity, although the Committee set on one side all scientific aids in settling the matter, and put in contrast incomparable conditions. In the test the electric-lamps were centrally suspended and equidistant; while the gas-lamps were in another road on standards irregularly spaced; but we do not gather that the Committee were willing to allow the Gas Company to utilize the electric central suspension to show what gas-lamps would do in the same circumstances as the electric-lamps. Were they afraid of this test? It seems that one condition was that 400-c.p. units were to be used; and the Gas Company installed 30 low-pressure lamps in the length of roadway they undertook to light, while the Electricity Department installed 14 so-called "half-watt" lamps in the length of road they undertook to illuminate. The Gas Company were distributing 12,000 c.p., as against the 5600 c.p. of the electric-lamps. In other words, the aggregate candle power of the latter was only 46·6 p.ct. of that of the former; but the "former" (the gas-lamps") had a considerably greater length of roadway to illuminate. The centrally suspended electric lamps were 22 ft. above the roadway, and the gas-lamps were 15 ft. high. Every man who knows anything about the travel of light is well aware that the reduction of light is in inverse ratio to the square of the distance from the source; and therefore a 400-c.p. source of light 22 ft. high would not at the surface of the roadway give the same amount of illumination as a 400-c.p. source of light at a height of 15 ft. If it does, then there is something wrong with this particular physical law.

Further Investigation of the Trial.

Then we see that the fourteen electric-lamps were 60 ft. apart; and so they were only called upon to light all told a length of 840 ft. of roadway. The gas-lamps, on the other hand, we are told, had an average interval between them of about 108 ft.—though the intervals varied from 42 ft. to 202 ft. Under such conditions, how could the gas-lamps help giving in the length of road varied degrees of illumination, and was it not a very natural thing that the electric-lamps centrally suspended at equal distances of 60 ft. should give more uniform illumination? There is a little vagueness as to the length of roadway illuminated by the gas-lamps. The information is that the average interval between the lamps was about 108 ft. Whether this means 108 ft. between the lamps on one side of the road, or between the staggered lamps, we do not know. But if between each lamp on the same side, the length of roadway lighted would be 1620 ft. So that, in every respect, the gas-lamps were at a disadvantage, except in the matter of height; and the gas-filled electric-lamps could not be, unless screened, at the lower level on account of their "abominable glare." Then there are the costs of the two systems. The comparison as it is set out in the report is altogether unfair, unless there is most scrupulous attention to the details. It shows the "total operating costs" for gas for twelve months to be £502 14s.; and for electricity, £214 10s. But this is for more than double the number of gas-lamps than electric-lamps, and (assuming that we are right in the 108 ft. being the distance between lamp and lamp on one side of the street) for illuminating double the length of roadway. There is another figure that we are not at all clear about. It says that the cost per annum for lighting 1000 ft. of roadway by electricity is £131 13s. 6d.; and yet the total operating costs per annum are shown at £214 10s. for 14 electric lamps, 60 ft. apart, or lighting 840 ft. of roadway between the lamps! It seems to us, too, that the electrical costs are very finely-cut. The electricity for fourteen 400-c.p. lamps is worked out at 1s. per hour. The private consumers would like to buy current at the same rate for lighting. The maintenance costs are put at a figure which smiles at lamp and labour prices to-day—£26 9s. per lighting year of 3791 hours! It is really wonderful what electricity will do in respect of street lighting when in the possession of a local authority, and on paper. When electricity has to be bought by a local authority from a company, a totally different tale is told. There have been some nice testimonials lately to the superiority of high-pressure gas lighting over all forms of electric lighting The gas lighting in the Hove competition was, as already stated, low-pressure. The points about the experiment that appeared to strike the Hove Corporation judges in favour of electricity was the central suspension and the disappearance of the standards from the side of the road. They also seemed to think there were considerable disadvantages for gas in central suspension over the Hove roads; but there has been in the City of London central suspension of gas-lamps for some years. It is really curious that news of such experience does not seem to have penetrated so far afield as Hove—at any rate, among the suppliers of electricity. Regarding unscreened, misnamed half-watt lamps centrally suspended, drivers of high vehicles are not very partial to them on account of the glare in their eyes as they keep watch ahead to avoid danger.

[The foregoing criticism of the report was written before one was received from Mr. C. H. Rutter, the Engineer and General Manager of the Brighton and Hove Gas Company, and which is reproduced from a local paper in our news columns to-day.]

The So-Called Half-Watt Lamp.

An interesting letter by "E. W. D.," who states that he is concerned in the contracting business, appears in the "Electrical Review," and will not be appreciated by makers of half-watt lamps. It is a protest against the misleading information in lamp makers' price lists, that "a half-watt type lamp consumes 0·5 watt per candle power." He says it does nothing of the sort; and in this he is repeating what photometrists know to be the truth. The false statement, he says, is most damaging to the electric lighting industry. The fault, in the opinion of "E. W. D.," lies in the fact that the metal filament and half-watt types of lamps are rated in watts, without any guarantee as to the amount of light they emit. The new unit of light-rating for lamps—the lumen—expresses in an accurate way the value of the total light flow (in all directions) from a lamp, and is the amount of light which will illuminate 1 sq. ft. of surface to the intensity of one foot-candle. The lumen therefore should be used as a basis for the comparative efficiencies of lamps. Utilizing data from manufacturers' lists, "E. W. D." finds the following:

200-250 *Volt.*

Metal Filament.			Half-Watt Lamp.		
Watts.	Lumens.	Lumens per Watt.	Watts.	Lumens.	Lumens per Watt.
20 ..	147 ..	7·35	60 ..	620 ..	10·26
60 ..	515 ..	8·60	1500 ..	26,000 ..	17·33

The number of lumens per watt of the 1500-watt half-watt lamp is 69 p.ct. greater than in the case of the 60-watt of this type; but despite this, the manufacturers' price list from which these figures are taken heads the schedule with the definition of efficiency "0·5 watt per candle power." If one is half-watt, the other is not; that is very obvious. But as a matter of fact, neither is. Now we come to the most interesting comparison: The 60-watt metal-filament lamp costs 3s. 6d., and emits 515 lumens, whereas the 60-watt "half-watt type" lamp costs 7s. 6d., and emits 620 lumens—an increase, therefore, in lighting efficiency of 20 p.ct only (not 100 p.ct., as is generally supposed) for an increased cost of no less than 114 p.ct. Also the life of the half-watt lamp is much less than that of the metal-filament type. Speaking in general terms,

and for industrial work in particular, the new low-wattage half-watt type lamps are not a sound proposition commercially—that is, to the user. To the manufacturer it is doubtless otherwise. "E. W. D." adds that the concentrated nature of the filament gives one the impression that the half-watt lamp is a very powerful one; and few would as a result of a practical demonstration believe, without further evidence, that the 60-watt half-watt lamp gives 20 p.ct. more light only than the 60-watt metal lamp.

Housing and Wiring.

The "Managing Engineer" of another contractor is concerned over a matter that has been the subject of a considerable amount of controversy—the wiring of dwellings under the new housing schemes. He knows of some houses that are being erected to a Ministry of Health specification, and are being wired for electric light. He finds that the wiring rules of the Institution of Electrical Engineers are being violated—push-joint conduit without continuity fittings is being installed. He wants to know whether the Ministry of Health and local building authorities regard the Wiring Rules Committee of the Institution as a "wash-out." He is curious as to why local authorities permit installations to their mains that do not comply with the Institution rules; and he wonders what the insurance companies will say who have adopted these rules, and have hitherto required compliance with them with the view to realizing as much safety as experts can suggest. The Ministry of Health, local authorities, and insurance companies must answer the questions. We cannot do it for them; and the "Electrical Review" has certainly not attempted the task.

DIESEL AND SEMI-DIESEL ENGINES.

Engine Lubrication and Lubricants.

THIS is a subject in which gas engineers are interested, as the Diesel types of engines supply a market for tar oils, and so increase the demand for them. A competitor that enhances by demand the value of a product of the industry with which it competes, is better than a successful competitor that does not provide business for it of any kind. The competition, of course, is with the land types of the engines, and not with those of the marine types; and interest lies in the direction of learning something about the competitor. At one time, the Diesel was surrounded with defects and shortcomings in comparison with the gas-engine. But with experience under diverse conditions the disadvantages have been very considerably reduced; and there cannot be to the same degree to-day the derogatory criticism that once obtained. Upon the Diesel and semi-Diesel engines a big book could now be written. But such a book would probably not receive the same extensive reading as will a little brochure on the subject that we have received from Price's Company, Ltd., of Battersea. The subject is dealt with in a dozen pages. In the first place, there is an historical review, which reminds us of the several precursors of the Diesel which ran on oil or motor spirit. But, of course, the Diesel is not the only type of engine that will operate on heavy oils. There is the Blackstone, which has successfully run on fuels of a very heavy class with a consumption at full load of 0·58 lb. per B.H.P. per hour. There are (as the pamphlet mentions) a number of other engines—*i.e.*, the Crossley, Ruston, Fielding, and Campbell—which inject the fuel by pump into high compressions; it being possible by such methods to burn heavy fuels either by heating the fuel oil, or by heating, prior to starting, a tube or bulb. In some engines, cold starting is possible by the use of a light fuel such as refined petroleum. Instead of the vaporization of heavy fuels, the basis of standard oil-engine practice is now to inject the fuel directly into the compressed charge of air.

A history of the development of the Diesel engine is given in the pamphlet; and then follows a reference to the Diesel as now constructed and worked. An extract will show the character of the information:

> The main features of the Die el engine are its economy in fuel consumption, its capacity to burn heavy fuels of the petroleum series, and tar oils within certain limits, its absence of ignition system, the air-blast system of fuel injection, and slow burning of the combustible mixture. The engine has been constructed on both the two-cycle and four-cycle systems. The former system, however, involves separate scavenging pumps and other modifications of design. Positive scavenging, it may be of interest to mention, is not of Continental origin, but was first employed on the large gas-engines of the Premier Gas-Engine Company, of Nottingham. There are certain advantages for the two-cycle engine—the absence of valves compared with the four-cycle, and the general design of the cylinder casting are in its favour; but time alone will decide the survival of the fittest.
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> The opponents of the Diesel engine are numerous—it being maintained that owing to its high compression it must be built of great strength, and is in consequence weighty and costly to construct. It is claimed, and with some justification, that engines with solid injection (which eliminates the need for somewhat troublesome air-compressors) give practically equal results.
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> At first sight, as compared with the four-cycle engine, the two-cycle engine appears to have many advantages, such as more even turning movement, lighter fly-wheels, and nearly double the power output, cylinder for cylinder, in addition to improved mechanical efficiency and a reduction in the size of the engine. There are factors, however, that tend to outweigh its advantages. In the four-cycle engine it is not necessary to employ separate pumps for scavenging the burnt gases, which work is largely performed on the exhaust stroke of the engine. The scavenging pumps must be capable of supplying a quantity of air equal to, or in excess of, the cylinder volume; therefore considerable power is required to operate them. This, *plus* maintenance and construction costs, is a considerable set-off against the advantage of the two-cycle system.
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> It is true that air-compressors on the Diesel system have been a bone of contention, and that their working has been at times fraught with trouble; but it has yet to be proved that a well-designed compressor, intelligently operated, has all the evils attributed to it.

Information is next given as to the marine type of Diesels; and then we are brought on to the important subject of lubrication. It is well known now that the class of oil suitable for lubricating a gas-engine piston will not do for an oil-engine, as there appears to be more tendency for the oil to carbonize and cause the rings in the piston to stick. This was pointed out by Crossley Bros. some time ago; but the trouble of piston sticking is now rarely met with, except in the case of a very old type of engine, or through neglect in the selection of a lubricant. Cheap lubricants are very dear, especially now when the cost of repairs and adjustments is a serious matter. The difference between the money spent on a good lubricant compared with a poor one is quickly off-set when troubles arising out of the inferior lubricant are encountered. Price's Company, Ltd., have, of course, had large experience in the production of lubricating oils. Their lubricants were successfully used on the Otto-Crossley gas-engine in 1877; and the accumulated knowledge in this direction has been applied to the problems of Diesel engine lubrication. The conditions of operation, fuel, temperatures, air-compressors, and the lubrication of the reciprocating parts, pistons, crossheads, crankshaft bearings, camshafts, and valve-gear have been the subject of very close investigation and observation under widely-varying conditions. While in Continental practice pure mineral oils are employed for lubrication, the firm have been able to obtain superior results with the use of compound oils. The lubrication of air-compressors is also important; and it is extremely necessary that the valves and pistons should have close attention in the selection of an oil. A point worth bearing in mind is that the lubricant that is best suited for large engines working continuously at full load may not be the best for engines which are inclined to develop high lubricating oil temperatures; and this accentuates the importance of careful selection, and if necessary of taking expert advice as to the class of lubricant that should be applied under given conditions.

Some particulars in regard to the operation of Diesel engines, as well as a few remarks on compressors, are included in this interesting pamphlet.

Making Carburetted Water Gas without Oil.

The publication of a paper read before the Southern Gas Association, in which Mr. J. C. Dickerman, the Engineer of the State Corporation Commission of Virginia, dealing with the high price of oil, advocated (to avoid the loss of money invested in water-gas plants) the use of blue water gas combined with coal gas, which the higher standards in vogue in the United States have hitherto evidently rendered more difficult of adoption there than elsewhere, has drawn from Mr. Frederick Egner, of Washington, a letter to the American Technical Press in which he says: "I looked over my records, and found the enclosed pages from the 'JOURNAL OF GAS LIGHTING,' published in London on Dec. 31, 1895. As that paper goes into considerable detail concerning the method of my producing carburetted water gas with a 'mixture of blue water gas and coal gas' (using Mr. Dickerman's words), and the whole is entirely practicable at this date, as it was 25 years ago, I send it as a part confirmation of Mr. Dickerman's remarks, and a possible aid, not only to the members of the Southern Gas Association, but of all readers who may be interested in the present difficulty concerning gas oil." Reference to the "JOURNAL" of July 28 last (p. 187), will show Mr. Dickerman mentioned that, inasmuch as without oil a gas of 550 to 600 B.Th.U. cannot be supplied, another standard that will permit the operations suggested must be adopted. Since blue water gas has a heating value of 300 to 325 B.Th.U., and coal gas one of 650 to 525 B.Th.U. (depending partly upon the quality of the coal, and still more upon the stage to which carbonization is carried), a direct mixture of equal volumes of blue water gas and good coal gas would probably give a heating value of 475 B.Th.U., though with a larger percentage of water gas a value of 450 B.Th.U., and possibly as low as 400 B.Th.U., would be necessary.

Illuminating the Interior of a Gas-Main.—A method is suggested in the pages of the "Gas Record" by which it is rendered an easy matter for the gas man to look into mains at intervals to see if naphthalene is collecting. A zinc chamber 5 in. in diameter and ½ in. high is soldered on to a 1¼-in. nipple. On the top of the chamber is placed a round piece of glass. This is made gas-tight by sealing-wax, and also rendered firm by using two set-screws placed on the outer edge of the chamber. Wires for an electric bulb enter the side of the chamber, and are connected to a dry battery by using two copper clips. The main is tapped, and the lighter is inserted, and is made gas-tight by the use of a bushing on the end of the threaded nipple. When the light is turned on, the inside of the main becomes clearly illuminated; and the presence of naphthalene or other foreign substances is detected without gas escaping.

SWISS SOCIETY OF THE GAS AND WATER INDUSTRY.

(*Continued from p.* 392.)

American Gas-Cooking Appliances and Business Methods.

A further paper by a member of the party of delegates of the Swiss Society of the Gas and Water Industry who visited the United States last year is that by M. Escher, who addressed the recent congress of the Society on his observations of American practice in the design of gas-cooking and other appliances, and in the intensive methods adopted in American towns for extending the sale of gas. An abridged translation of M. Escher's address, which has just been published, is as follows.

Owing to the difficulty in many American dwellings of storing coal, the gas companies have an easier task in exploiting gas-cooking appliances than is the case in corresponding European centres of population. Also, so far as the use of gas for cooking in hotels and for industrial purposes is concerned, prejudice is a much less adverse factor than in Europe. M. Escher gives it as his opinion that it is difficult to find a European hotel adequately fitted for gas-cooking; whereas in America every hotel kitchen uses only gas, although the kitchen staff, from the chef downwards, are almost entirely European.

As a rule, the gas-cooker for small domestic establishments is not fitted with low-consumption burners, but with those of radial or ring pattern, as were formerly used in Europe. In many gas-ovens of this type separate rows of burners are adopted; but in general small flames are not the practice. They are, however, occasionally used; and there is almost invariably a small burner placed on one side for the purpose of keeping up the heat which has been quickly produced by the larger burners. The burners have a number of small holes for the passage of the gas. The flames are vertical, and impinge directly on the bottom of the vessel. A good deal of care is given to the shape of the burners, which are arranged in star, radio, or ring form; and ample means are employed for supplying them with air. For lighting, a small burner is often provided midway in the oven. On applying a match to this, four flames are lit, and, in turn, light the other burners. The fitments for turning-off and adjusting the gas supply are largely different from those in Europe. Instead of taps, a screw-valve of the needle type is frequently used, since it facilitates the nice adjustment of the flame which is required by variations of pressure, particularly in the use of natural gas. The ordinary taps are almost invariably fitted with spiral springs for keeping the barrels in place.

Great importance is attached to the adjustment of gas and air. All the taps allow of the adjustment of the gas-jet by means of a fitting which can be screwed against the point of the tap, and is of needle form. The gas flows laterally from the point of the tap, and is more or less strangled according to the penetration of the point into the corresponding member of the attachment. The adjustment of air is very simply done by means of two discs, each radially slotted, which are arranged in contact with each other on the same axis, and so can be turned one in respect to the other for the admission of air through the full space of the slots, or through any smaller area produced by turning one of the discs.

As a rule, the domestic gas cooking-oven is placed level with the stove top, either to right or left. Most cookers are fitted with an oven door of specially hardened glass, allowing of the contents of the oven being always in view. The provision of a plate warmer and a back-plate is the invariable practice. It was somewhat surprising, however, to notice the inferior finish of the stoves compared with those in Europe. Recent models are certainly better in this respect than those of a few years ago; but all the cast-iron parts of the appliances are of exceedingly clean finish. The foundries use an extremely fine sand, which yields excellent results. In general, American gas-stove makers give particular attention to good construction. The ovens are double-walled, providing an insulating air-space, and have two rows of burners. The common test for a good oven is to lay a sheet of paper on the ordinary shelf and to turn the heat full on. The paper should then be uniformly browned on both sides.

Owing to the widespread use of natural gas, the supply of which is liable to irregular suspension, parts of the country using this gas are supplied with stoves which can be used also for coal; but the appliances are not of good appearance, and do not compare with those of a European maker of gas-coal ranges.

The gas-ranges made for hotel use are of very different construction. All the hotel ranges are made with a top forming a hot-plate on which cooking is done. Various arrangements of burners are adopted for heating the plate. According to some, a series of bunsen burners is fixed horizontally along the front of the range and spread underneath the plate towards the rear; in others, the flames are directed from one side to the other. It is the general practice to make hotel ranges in the shape of units of moderate size, several of which are placed in line if accommodation for a large amount of cooking is required. Installations of various large sizes are not manufactured. All these cookers are provided with flues for the escape of the burnt gas. Those used for the cooking of the American breakfast are frequently fitted with grillers; and it is usual to have a double back wall carrying a plate warmer, which is supplied in very large measure by the waste heat.

A special form of range much used in American hotels is the so-called "broiler"—a grill with an adjustable grid, which can be placed at different heights and is used for roasting large pieces of meat. It is made in several sizes, and, as in the case of the ordinary ranges, a large equipment is formed from a number of units. An appliance which is much used is the "Salamander"—a kind of griller which, like the boiler, is heated with blue flames. Its name is applied in reference to its various uses. The movable grill in the lower part is used for roasting small portions of meat, fish, or poultry; while on the hot-plate above food is cooked in small vessels, and cakes are baked directly on the plate. This range is employed also for baking breakfast rolls and white bread. The importance which gas companies attach to the demand from the kitchen departments of hotels is shown by the fact that there is almost invariably a special hotel branch which cultivates and extends the sale of gas for this purpose. The elaborate catalogues of manufacturers of hotel ranges tell the same tale.

In the large hotels gas is used not only for ordinary cooking operations, but for the baking of bread. All the large hotels bake the bread for their customers and staff; and since the number of guests in a large hotel may be more than 2000, it will be understood that the baking is an important department.

In the conversion of the old coal baking-ovens to the use of gas, much success has attended the introduction of a system of internal heating of the oven by means of a pressure air-gas burner. This is known in one form as the "Premix" system, and was described in the "JOURNAL" for Aug. 6, 1918 (p. 254). The blower consists of a fan connected to an electric motor, and takes in gas and air simultaneously. An ingenious regulator of the proportion of air and gas is used. On opening the gas-tap the air inlet is automatically opened to the required extent, supplying a mixture in the right proportion. According to the New York Gas Company, it has been found easy to introduce this system of heating ovens. Very little cost is entailed in alteration of the oven, and, of course, the system is applicable to ovens made for ordinary heating by gas, not only for the cooking of pastry, but for bread. On the small industrial scale, the fan blower just referred to is also used; but for industrial operations on a larger scale a Roots blower is adopted. For industrial purposes, furnaces working with compressed gas or compressed air, such as those familiar in Europe, are very widely used. Nevertheless, it seems that the "Premix" blower used for the compression of a suitable mixture of air and gas yields remarkable results.

For the heating of water, appliances which provide a supply of hot water are preferred to those which generate it as required. Though the efficiency of the former is somewhat less, the smaller size of the gas-mains and of the meter are compensating factors; a five-burner meter being almost always of sufficient size. As a rule, the heaters are of a type familiar in Europe—namely, cylindrical bodies fitted with brazed copper coils. The Junkers system appears not to be used. Water-heaters are popular among the American public, and are the subject of a very active advertisement campaign by the gas companies.

The heating of rooms by gas is widely adopted, particularly in districts supplied with the relatively cheap natural gas. Large installations of central heating by gas are met with. The boilers are of cast iron, and in pattern similar to those in Europe. For large rooms requiring rapid heating, hot-air systems are frequently used. The air is heated indirectly by a stove of wrought iron provided with large burners, and, after contact with the heated surfaces, enters the rooms along conduits; while the products of combustion from the stove are led into the chimneys. Similar appliances for heating with coal are employed.

Widespread use is made of all kinds of direct heating from gas-radiators, in appearance like those used in central heating. There is a great demand for these appliances at the approach of winter. M. Escher once happened to be in the sale rooms of the New York Gas Company towards the beginning of October, at the time of cold snap, and was able to see for himself the remarkable effect of a change in the weather on the demand for small gas-fires. The American, as is well known, must have his rooms thoroughly heated—a national characteristic which accounts for the large business done in gas-fires.

Among other gas appliances are those for washing, drying, and ironing, which enjoy a measure of popularity among those who can afford their rather high cost, and whose homes allow of their being used. The driers are very practical. They are heated either directly by burners or by the products of combustion of a small heater which also gives a supply of hot water. An installation of the three appliances allows of a large wash being done in a few hours. But it seems that the gas companies are of divided views as to the value of these appliances as the subject of propaganda. At Detroit, M. Escher gathered that they do not repay an advertisement campaign; whereas at Chicago it was claimed that window demonstrations of them had very greatly increased their sales. It is found the demand for them comes from the small hotels and boarding establishments, on account of their rapidity in dealing with the washing of linen, &c.

In concluding his notes on the appliances which gas companies n the United States seek to popularize among their customers, M. Escher emphasizes the fact that American gas undertakings largely ignore trade from bye-products. The whole efforts of a

company are intensively directed to the sale of gas, which, without exception, is regarded as their chief product.

THE COMMERCIAL DIRECTION.

In describing the commercial side of the American gas industry, too much emphasis cannot be laid upon the prominence with which the service is brought to the notice of the public. It is the rule for a company's offices to be a handsome building in the best business thoroughfare. The show-rooms, which the public can freely visit, are luxuriously furnished. They comprise show-rooms for appliances for cooking, for hot water, for hotel kitchens, and for industrial and trade purposes. Adjoining them, for the free use of the public, are information bureaux and reading and writing rooms. Great importance is attached to having a staff of qualified salesmen. Each speciality has its salesman, familiar with the goods and with the customers' requirements. Payment of the salesmen is largely on commission. Many of these employees have no fixed salary, but are remunerated from the sales they make. This is especially the practice in the case of hotel equipment, domestic appliances, &c., in the sale of which these agents employ sub-agents, whom they pay out of their own pocket. Proficient salesmen thus stand to make a good deal—in fact, the maintenance of sales at a high figure is a condition of their remaining with the company.

A characteristic of the American salesman is that not only is he a specialist in his goods, but he is endowed with great powers of persuasion, and is very frequently something of a character. There is a whole literature on the training of salesmen—volumes which well represent the American commercial spirit. Also in the large works there are schools for the employees responsible for the inspection of gas appliances, and whose business it is to put right faulty cookers, water heaters, and other appliances. Schools are also held for other branches of the staff. In one of these schools of the New York Gas Company, M. Escher relates that he saw a whole exhibition of appliances, gas-meters, &c., in which defects had been deliberately produced. Those in the schools have to qualify themselves for investigating and remedying the causes of such defects as flickering burners, insufficient pressure, &c.; for an American company actively concerns itself not only with the sale of new appliances, but with the maintenance of those which it has installed. The repair shops of the New York Gas Company occupy enormous premises where, as was seen, appliances are excellently repaired.

Shop window displays form an important part of the advertising campaign. The mere exhibition of goods is not considered adequate; but demonstrations of their working are a regular feature. In the windows of the Chicago Gas Company, M. Escher saw a laundry plant comprising two wash-boilers, and ironing and drying machines in process of being continuously used for laundering batches of linen. A complete working bakery is another exhibit of this kind; and one gas company, in order to demonstrate the working of its water-heaters, converted the shop window into a swimming bath, in which small negro boys disported themselves throughout the day. Still another advertising method consists in the procession through the streets of the town of a decorated car on which is mounted a gas fire or cooker in full working.

The taking of meter readings is exceedingly well organized. In Detroit, for example, where there are about 300,000 consumers, forty readers of meters are employed. The town is divided into 120 sectors, three of which are allotted to one reader. Owing to the geometrical pattern of American towns, a given sector consisting of entire streets can be allotted to one employee. Readers are provided with loose sheets corresponding with the meters to be read during a day, and secured to a stiff card with a rubber band. An entry is made of the meter reading in the column provided for the month, and the sheets brought back each evening. In each sector readings are taken during the course of a working week, and the accounts presented the following week; two days' work being required per sector for this latter. The employee thus calls on each subscriber twice a month. The sheets are provided with monthly coupons, which are detached as soon as the reading has been taken for the particulars to be entered in a register. The account is made out as follows: One employee transcribes from the register the meter reading of the preceding month, another enters the reading for the current month from the detached coupon, and a third calculates the consumption and the total of the account with a calculating machine. Payment for the meter readings and book-keeping is made on a bonus system, which is found to result in the work being done with great rapidity. The minimum number of readings to be made daily by one employee is 385, payment for which is $5. For each further reading 1·3 c. is paid. It was stated by the management that about 700 readings per day are made on this system. But the reader is paid only for readings actually made. If, for example, he brings in 395 readings, and has failed to find 27 other consumers, while, on the other hand, he has taken readings from 31 consumers who were not in the previous day's list, he is paid for only 426 readings.

In making out the accounts, the discounts allowed (if payment is made within a certain short time, which are stated on the back of the account form), are brought on to the front; but this discount is in no circumstances given if payment is not made within the prescribed time. This rule is effective in securing prompt payment.

No payments are collected in cash from the consumers, who remit by post or pay at one of the offices of the company. In case of non-payment after the expiry of one month, the gas supply is cut off. The total of accounts which are not paid on the first presentation represents from 12 to 14 p.ct. of the money value. In general, payment is almost completely made on the first notification that it is overdue; so that bad debts amount to only 0·5 to 1 p.ct. The account forms include two columns, for the reason that there is very frequently a change of meter. The advantages of this system are that the reader of the meter does not know the preceding reading. It is thus impossible for him to tamper with the readings, as was the case on a large scale some time ago at Chicago, where serious irregularities were committed. Since payment is not made by cash, the risks attached to the employment of collectors are avoided; while the regular adherence to non-allowance of discounts in the case of delayed payments is found to be satisfactory in bringing in the bulk of the receipts promptly. Most towns have adopted a similar system; and this fact no doubt accounts for the comparatively slight use of prepayment meters which is found in America. In New York, Chicago, and some other towns, however, many of these meters are employed.

THE MINING AND SHIPPING OF COAL.

M. Escher, in concluding his paper, adds a few notes on his observations of the mining and shipping of coal in the United States. In a Pittsburg mine of the Bertha Coal Company, producing from 300 to 400 tons per day, it was surprising to find that the entrance to the mine consisted of a horizontal gallery in which the miners could be seen going in and out with their open-flame acetylene lamps. This gallery, it appeared, passed through a seam of coal of about 1·6 to 1·8 m. depth, which extended from its sides at a low gradient. The gallery led into the lode, breaking up in fan formation into others from which coal was being taken. The coal was dislodged by means of an excavating tool at a depth of about 1 m.; the upper part of the seam being then removed by small charges of powder. In this way several cubic metres of the coal are obtained at one operation, and are immediately loaded on trucks running on rails, the laying of which keeps pace as far as possible with the progress of the work. The trucks hold about 2 tons, and are drawn in trains of eight or ten by means of a small electric locomotive. At the end of the gallery the trains travel to the railway station, situated about 1½ kilometres away. As the depth of the working is only about 30 m., there is scarcely any accumulation of firedamp. Extraction and transport being thus of the most simple kind, the cost is low—about $1·05 per ton. The low depth of the deposit led M. Escher to doubt if it was of good coal; but it was stated to be bituminous coal of good quality, although of somewhat high sulphur content, like most of the coals to be found in the district—a statement that was subsequently confirmed by analyses of a sample brought away.

The screening of the coals is a very simple operation. Owing to the fact that the content of stone is small, not much washing is done—at any rate, in the districts visited. Screening, in most cases, is carried out when loading the railway wagons by means of inclined screens on which the contents of the mine trucks are thrown; the operation consisting in the separation of the fine coal from the pieces.

As regards shipping, the whole export of coal is subject to Government regulation. The mines deliver their coals, not direct to the shippers, but to an official body—the Tide Water Exchange—who distribute it among the exporters. At Pittsburg and Washington are offices undertaking the control of the quality of the coal from each mine. The coal is classed as such and such a quality "Pool," and each variety of coal is given a "Pool" number. Stores of various coals according to the "Pool" classification are established at the several ports, and on the mine being advised that its coal is given a certain "Pool" number, the authorized quantities are delivered to the respective ports, at which are thus established supplies of the quality and quantity necessary for the available shipping. By the modern plant at the ports the loading of a vessel of 8000 tons takes about two days. The loaded wagons, each containing 50 to 70 tons, are run on to a raised weighbridge, and are tipped over sideways. The coal falls on large band conveyors of about 1·5 m. wide, which line the quay and direct the coal on to a transporter delivering it directly into the ship's bunkers. The whole of the new plant for the handling of coal at Baltimore has been constructed on this principle.

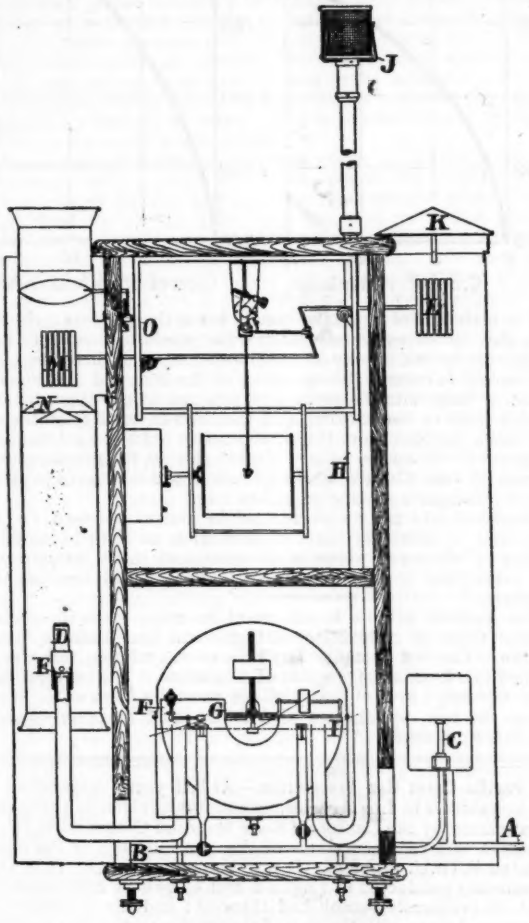
In bringing his observations to a close, M. Escher pays a warm tribute to the great help rendered to the Swiss gas industry by Dr. Sulzer, the Swiss Ambassador in the United States, in the supply of coal to Swiss gas-works.

New Books Received.—Pending an opportunity for fuller notice, acknowledgment has to be made of the receipt from Messrs. Crosby Lockwood & Son of an addition to the series of Lockwood's Trade Manuals, in the form of a handy-sized book on "Gas-Fitting and Appliances," by Frank W. Briggs and John H. Henwood, the price of which is 6s. net. The eighteen chapters are plentifully illustrated; and the authors say it has been their aim to bring up to date a text-book on gas-fitting, which embodies their practical experience in the trade during the past twenty-five years. From Messrs. Jordan & Sons, Ltd., of Chancery Lane, comes a booklet, priced 1s. 9d. net, entitled "Debentures; the Purposes they Serve and How they are Issued."

THE "PRECISION" CALORGRAPH.

The Precision Instrument Company, of Newark (N.J.), have developed a recording calorimeter which is said to give satisfactory results with a minimum of care and expense. The instrument was lately described in the American "Gas Age."

The "Precision" Calorgraph records on a chart the gross heating value of a gas under the actual atmospheric conditions of temperature and pressure. It can best be understood by comparing it with the indicating calorimeter. With the indicating calorimeter, the volume of gas, the quantity of water, and the rise in temperature of the water must be measured, and the heating value calculated from these variables. If when using the indicating calorimeter both the volume of gas and quantity of water could be kept absolutely constant, the rise in temperature of the water would be directly proportional to the heating value



Section of the Calorgraph.

of the gas. This same principle is used in the "Precision Calorgraph," except that air, in place of water, is used to absorb the heat of the gas. The heat from the combustion of a constant volume of gas is caused to warm a certain quantity of air, thus making the rise in temperature of the air a measure of the heating value of the gas. This rise in temperature of the air is measured by a differential thermometer, the movement of which is transmitted to a pen-arm. The pen records the heating value of the gas upon a chart moved by clockwork.

OPERATION OF THE INSTRUMENT.

The recording mechanism is in the upper part of the case, and the volume governor below. The constant consumption of gas is obtained by means of the patented volume governor, which compensates for variations in both the pressure and the specific gravity of the gas. The gas enters the instrument at A (the connection B is for testing only), first passing through the pressure regulator C, and then going to the volume governor. The pressure regulator takes care of any large fluctuation of pressure in the line, and delivers the gas to the volume governor at an approximately constant pressure. If it were not for the volume governor, any increase in pressure or decrease in specific gravity would increase the flow of gas to the B.Th.U. burner D.

The volume of gas flowing to the burner is determined by the pressure before the orifice E—*i.e.*, the pressure in the chamber F. Any increase in pressure in the chamber F will tend to raise that side of the cradle, thus closing the valve G, and bringing the pressure back to normal. Also, any decrease in specific gravity of the gas will reduce the weight of gas in the gravity tube H, thus reducing the pressure in the chamber I. This has the same effect as removing part of the weight from the left side of the cradle, thereby reducing the pressure in the chamber F an amount proportional to the specific gravity of the gas, and keeping the flow to the B.Th.U. burner constant as the specific gravity changes. Similarly, any decrease in pressure or any increase in specific gravity will have the opposite effect. The cradle of the volume governor is perfectly balanced, so as to eliminate all forces except those due to the pressure and specific gravity of the gas. The heat from the gravity burner J has no effect upon the reading of the instrument; and the gas is burned simply to keep it from escaping to the atmosphere.

The air enters the instrument at K, passing over one diaphragm L of the differential thermometer, and then down under the volume governor to the B.Th.U. burner. The products of combustion and heated air rise through the stack, passing over the other diaphragm M of the differential thermometer. The baffle N protects the diaphragm from the direct radiation of heat from the B.Th.U. burner. The diaphragms are connected to the pen-arm by suitable rods and levers to record the heating value of the gas upon a chart graduated in the proper units. The chart passes over a drum revolved by clockwork.

The instrument is calibrated by the damper O. Closing the damper increases the reading of the instrument, while opening the damper decreases the reading.

To reduce friction to a minimum, all bearings are made with pivot screws of hardened non-corrosive metal. The instrument weighs about 83 lbs. and stands some 37 in. high, exclusive of the gravity tube, which extends about 2 ft. higher. It can be supplied with a chart range suitable for any type of gas. The instrument should be located at a point where it will be free from excessive draught and vibration. Neither water-heaters nor water-storage tanks are required, as with the water-flow calorimeter.

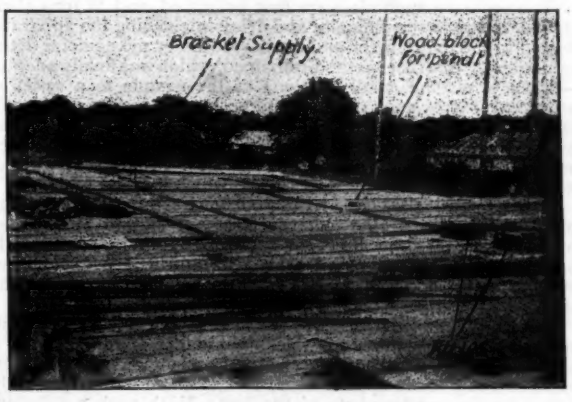
After the instrument is in operation, practically the only attention it requires is the routine duty of cutting-off the chart, filling the pen, and winding the clock. There is no tedious process of regulating a water or gas supply, as with the indicating calorimeter. The instrument is entirely automatic.

If the gas contains tar, a coating will be formed on the parts of the instrument in contact with the gas, making it necessary to clean these parts when the coating becomes heavy enough to affect the accuracy of the instrument. If a filter is installed when using a dirty gas, this trouble will be eliminated. On ordinary city gas, the instrument will run for six months to a year, and show no signs of trouble.

Like all other recording instruments of this class, the accuracy must be checked from time to time. The instrument should be checked with a standard calorimeter about once a week. Over this period it will run within 9 units on a gas having a heating value of 600 B.Th.U., thus giving an accuracy of about 1·5 p.ct. Slight errors can be corrected by adjusting the damper.

CARCASSING CONCRETE COTTAGES.

The following article dealing with the subject of providing gas-supply pipes in concrete cottages is contributed by "N. B. I." to the September issue of the Birmingham Corporation Gas Department Magazine, to the Editor of which we are indebted for the accompanying illustration.



Gas-Supply Pipes being laid on the "Shuttering."

Many materials are being used nowadays in the construction of the much-needed "homes for heroes." Concrete is, perhaps, the most promising substitute for bricks; and there are two well-known systems of concrete construction now being used in the building of houses for the Birmingham Corporation. One is the Dorman Long steel-framed system, and the other that of the Unit Construction Company, of London. Both present unusual features from the gas-fitters' standpoint, owing to the absence of wood floor-joists and the substitution of reinforced concrete floors.

In the last-named Company's job at Yardley Wood, it was not at first apparent how the carcassing—*i.e.*, the fitting of the gas-supply pipes from the meter position to the different points—was to be carried out. It was suggested that the pipes would have to be laid on the face of the ceilings—an unsightly method to most people, and one open to several other objections. One suggestion was to leave channels in the concrete for the pipes; but many objections were raised against this. Finally, it was decided to bury the pipes in the concrete floor. The work is carried out in this way.

The walls of the pair or block of houses, which consist of concrete blocks (with a cavity between in the case of outside and party walls) are built-up as far as the bedroom floors. A temporary wooden floor is then put-up, consisting of stout battens supported from below. Around the outside, and around the well of the stairs and flues, a wood skirting is put about 5 in. high, the thickness of the floor to be made. This temporary floor is called "shuttering," and upon this the gas-fitter lays the gas-supply pipes, as in the illustration.

The positions where pendant-drops are to go through, and pipes to rise to bedroom brackets, are carefully marked on the shuttering from a plan. The fitter leaves short pieces of pipe dropping through the shuttering or standing vertically as required, about 6 in. or 7 in., so that they will come above the concrete. The pipes are plugged for the time being. They are carefully tested for soundness, and then the concretors come along. An expanded metal reinforcement is used.

When the floor is set, the shuttering is taken down from below, and what was top of the temporary floor is now the ceiling of the downstairs rooms; the gas-supply pipes being fast in the solid floor. The upper part of the houses is now built-up; and the fitter completes his supplies in the usual way. Wood blocks are built in the concrete floor at pendant positions; and the wooden blocks required for bracket positions are put in when the concrete blocks constituting the wall or partition are moulded.

The first pair of houses are now being completed; and the method appears to be quite successful. The only objection seems to be that the pipes once laid are afterwards inaccessible. But being of adequate size (nothing less than ¾ in.) and quite protected from the ordinary corroding influences, on the outside at any rate, this objection is much minimized. Tees and plugs are left at the bottom of upright supplies, which are accessible at any time for cleaning purposes; and care is taken that the horizontal pipes fall in the right direction.

The gas-fitting work is being carried out by the department. There are 81 houses in the scheme; but it is very probable that wooden joists and floors will be used in a lot of these.

DETERMINATION OF THE SPECIFIC GRAVITY OF COAL AND ITS PRODUCTS.

By HAROLD J. HAILSTONE, of Rochdale.

IN carrying out a series of experiments on pitch and bitumen mixtures, it was found necessary to adopt a rapid method for the determination of the specific gravity of the numerous mixtures. The method required was one that would give results with the minimum of delay and need only a small quantity of the sample under test. It must also be one suitable for mixtures varying from viscous liquids to plastic masses and solids.

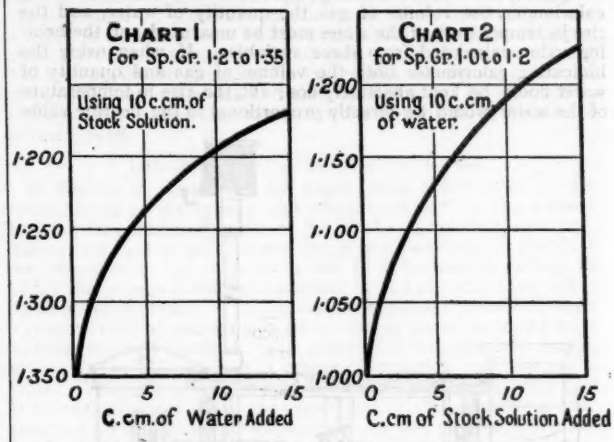
The ordinary methods were first examined, and in turn abandoned, owing to the difficulty and delay in cleaning the apparatus fouled in the hydrometer and gravity-bottle or pyknometer determinations. Another method remained, which was finally adopted—namely, placing small portions of the sample in a series of solutions of increasing density, and noting the gravity of the particular solution which served to maintain the sample in suspension—neither floating on the top nor sinking to the bottom. The solution to be used for this purpose must be one that will not affect the material in any way, and in which it is insoluble.

Various substances were tried—aqueous solutions of salt, sulphate of ammonia, zinc chloride, &c.—but had to be rejected owing to the fact either that they could not be obtained sufficiently dense or that they possessed a high surface-tension (insufficient wetting power) and caused the tarry material to adhere to the sides of the containing vessel, thereby vitiating the test.

After numerous trials, it was decided finally to employ a concentrated solution of sodium thiosulphate (commercial "hypo"), which is stable, does not react with the common tar products, can be readily made-up to a dense solution, and is thus perfectly suited to the requirements of the test. With such a solution, determinations can be rapidly carried out on coals, pitches, tars, and creosotes having specific gravities from 1·0 to 1·35.

In adopting the method, a saturated solution of "hypo" is made-up and carefully reduced to a gravity of 1·350 (70° Tw.) by the addition of the necessary volume of water. The specific gravity is observed by trial at 60° Fahr. with the hydrometer or bottle. This stock solution will keep indefinitely, but may be checked from time to time. It should be stored at room temperature so as to avoid the deposition of crystals, and consequent change in quality.

For the examination of coals or pitches, 10 c.cs. of the stock solution are run carefully from a burette into a dry 1-inch diameter test-tube, and a small pellet of the pitch dropped in. This will be found to float on the top, and water is run in, a few drops at a time, from another burette—the contents of the tube being well mixed after each addition. A point is soon reached when the pitch ceases to float, and remains suspended in the liquid. Any further addition of water causes the pitch to sink to the bottom. On reaching the point of suspension, the volume of water used is read off from the burette. A repeat test may be made to confirm the result; and from this figure the specific gravity may be found direct from a graph similar to Chart 1. Thus, if 2·1 c.cs. of water were required, the specific gravity of the sample would be 1·280.



For materials of a specific gravity lower than 1·2—as creosotes, tars, &c.—an excessive volume of water would be needed to sufficiently reduce the density of the solution; and it is, therefore, more convenient to reverse the operation of the test, and measure-out 10 cc. of water into the clean tube, add one drop of the substance (which sinks to the bottom), and then run-in small quantities of the stock solution from the other burette until the substance is suspended. From the volume of solution used, the specific gravity is read off—see Chart 2, where 5·1 c.cs. of the solution is required, which indicates a specific gravity of 1·14.

Similar charts can be plotted out for ranges between 1·0 and 1·35 (and to whatever scale is desired) from data obtained in mixing-off measured volumes of water and stock solution, and the subsequent specific gravity determinations of the resultant mixtures.

The method will be found useful in many ways for routine control tests in connection with gas and bye-products manufacture. The test occupies very little over a minute, and can be applied to a fraction of a gram of substance. The only precautions necessary are (*a*) the solutions must be kept at 60° Fahr. during the test, (*b*) adherent air-bubbles must be removed from the tested material.

Pacific Coast Gas Association.—At last year's convention of the Association in Los Angeles, attention was given to a proposed investigation by the California State Railroad Commission, in co-operation with representatives of the gas industry, of the much disputed B.Th.U. problem. It was announced at the time that experiments conducted in England and elsewhere had tended to upset all previously established theories; and the investigation was entered upon with the idea of thoroughly testing this problem from every conceivable standpoint and under varied conditions, in order that it might be determined, once and for all, just what thermal unit standard should be definitely accepted as being the best for the manufacturer and the consumer. The investigation is now in progress; and it is not expected that a decision will be reached before a year or more from now. Progress will, however, be reported at the forthcoming Portland Convention of the Association, at which a number of other subjects are also down for discussion.

Blast-Furnace Gas-Engines.—Describing a large gas-blowing installation with Galloway engines, in connection with the blast-furnace plant at Palmer's Shipbuilding and Iron Company, Ltd., Jarrow-on-Tyne, the "Iron and Coal Trades Review" says that hitherto it has been customary to regard with a certain amount of distrust the gas-engine working upon blast-furnace gas, on account of the high initial cost of the installation and the maintenance charges. It must be admitted that in many installations these last have been unduly high, due in part, no doubt, to inherent defects in the engine design, but in a much greater degree to lack of proper appreciation on the part of the users of the necessity of supplying clean gas to such engines. With clean gas maintenance costs are low. It may be assumed that the blast-furnace is among the most efficient of gas producers, while the gas produced is ideal fuel for a gas-engine, producing one B.H P. at a cost of approximately 10,000 B.Th.U. per hour—a performance which cannot be equalled by any other type of prime mover. To maintain the engine on constant duty, it is essential that the gas should be free from tar and suspended moisture, and the dust content should not exceed 0·01 gr. per cubic metre. Given these conditions, which are easily met with in modern dry-clean plants, the gas-engine is at least as reliable as the steam-engine.

SEMET-SOLVAY DIRECT SULPHATE PROCESS.

In connection with a modern bye-product coke-oven plant at the works of the Ford Motor Company, River Rouge (Mich.), as described by Mr. S. R. Bellamy in a paper read before the Canadian meeting of the American Institute of Chemical Engineers, ammonia is recovered by the Semet-Solvay direct ammonium sulphate process, which, representing over eight years' extensive experience with direct methods, marks, says the author, a notable achievement in chemical engineering. The process is direct in operation, is practically automatic, and produces a pure white salt. The high yields obtained are explained readily by the direct manner in which the gas is treated, and by the control of the ammonia reactions.

In the first place, each oven is properly filled with coal, so that favourable conditions exist at the start. The coke-oven gas, on leaving the ovens, travels a short distance from the hydraulic main, and then passes through a two-compartment cooler. From the cooler an exhauster (Curtiss steam-turbine) takes the gas, and sends it under pressure through a tar extractor of the "P. & A." type, and then through another two-compartment apparatus called an economizer, from which it goes to the saturator. The gas leaves the saturator *minus* its ammonia, is freed of acid, and then cooled for benzole recovery. This is the full journey of the gas so far as ammonia is concerned.

The gas enters the two-compartment cooler at a temperature slightly above 80° C. In the first compartment, the temperature is lowered about 30° C.; and in the second compartment, it is brought down to 30° C. This temperature of 30° C. has been found to be the critical one for proper condensation in conjunction with minimum effort for subsequent heating. The cooling medium is a weak ammonia liquor which, travelling over grids countercurrent to the gas, is very efficient. The strength of the liquor is maintained, so that only a minimum amount of NH_3 will be absorbed in the cooling of the gas and the condensation of the light tars. Separation of the tar and liquor is effected in the coolers, which have a large base, by means of decantation. The tar is drawn-off from the bottom, and runs to a decanter, while the liquor entering the suction pipe of the pump at a higher point is sent through cooling coils, and then back to the gas-cooler. Each compartment of this cooler has its own circulation. A special constant-level overflow device maintains an even volume of liquor for circulation, by carrying away an amount equivalent to that added by condensation and absorption of ammonia. Ammonia thus held in solution has to be liberated by steam and lime in a still, from which it returns to the gas at the inlet to the saturator. With this exception, the process is "direct."

The Curtiss steam-turbine, whose primary function is that of an exhauster, serves in a threefold manner; for in pumping the gas it is at the same time an efficient tar-extractor. Due to the heat of compression, the gas leaves the turbine at 50° C., or about 20° C. higher than it entered. Thus the turbine is an exhauster, tar-extractor, and heater combined. The "P. & A." tar-extractor removes the last trace of tar.

From the tar-extractor the gas goes to the economizer, where it is brought into contact with the liquor of condensation from the hydraulic main, to pick-up and restore to the gas some of the water of condensation and the free ammonia. The gas leaving the economizer is at the proper temperature for the sulphate reaction.

The clean gas at 70° C. enters the saturator, which contains sulphuric acid of 45 G.P.L. strength—*i.e.*, nearly normal acid. The saturated acid is lifted by means of an air-ejector into a sludge tank, in which crystallization takes place; and the unsaturated acid drains back to the saturator. The salt goes to a centrifugal, where it is first dried, and then washed with water. It is dumped from the centrifugal into barrows, weighed, and conveyed to a large hopper, from which it is handled into storage by an overhead crane.

A small stream of fresh acid (60° Baume) flowing into the saturator keeps the strength at the proper mark. With acid of the proper strength and gas at the proper temperature, objectionable crystal formation does not take place in the saturator. The small amount of crystals that are bound to form on metal surfaces are not permitted to accumulate. Once each day for a few minutes the acid strength is built up 125 G.P.L.; and thus all crystals are dissolved, and a clean saturator maintained.

The results obtained at the Ford plant are indicative of the progress that the process makes in ammonia recovery. The high yields, as shown in the tables of operating data, were obtained from a coal mixture containing 20 p.ct. low volatile coal. From straight high volatile coal, higher yields may be expected.

As important as the yield of bye-products is the cost of production. The unit cost is the test that tells the tale. During the month of April, this plant produced over 1,500,000 lbs. of ammonium sulphate, with an operating force of five men per eight-hour shift and one foreman. This foreman also has charge of the light-oil plant.

One of the most essential points in a direct ammonium sulphate process is clean gas. Practically all the treatment through which the gas passes preparatory to its entrance to the saturators is with the one purpose of obtaining clean gas. Upon the success of this treatment the purity and colour of the sulphate depends. Hence the vital question is, "How clean is the gas?" To determine this, the filter-paper method devised by the Semet-Solvay Company has been found very valuable. By means of an apparatus called the tar-camera, a known volume of gas can be drawn through filter-paper and a comparison made of the colour produced on the filter-paper to indicate the degree of purification of the gas. As usually performed, two filter-papers are used for each test to absorb the tar from 8 litres of gas.

The amount of tar carried by the gas should be reported by comparing these filter-papers with a photographic scale similar to that used in any colour comparison quantitative test; or where great accuracy is required, the determination is made by weighing the filter-papers before and after the picture. This apparatus can also be used for the determination of the sulphuretted hydrogen in the gas. In this test, the filter-papers used are, of course, moistened with lead acetate.

FORD OPERATING DATA, 1920.

Actual Results of Semet-Solvay Direct Ammonium Sulphate Process.

—	Jan.	Feb.	March.	April.	May.
Dry coal charged, tons per day	1813	1813	2030	2022	1911
Coal moisture, p.ct.	5·2	4·4	4·0	3·5	3·5
Sulphate yield, com. lbs. per ton	25·7	26 5	25 9	25·8	26·8
P.ct. NH_3 in sulphate	25 01	24·94	25·00	24·99	25·00
Acid consumed per lb.	1·07	1 01	0 95	1·00	1·02
$(NH_4)_2SO_4$ p.ct. free acid in sulphate	0·169	0·135	0·125	0·112	0·151
P.ct. moisture in sulphate	2·25	2·42	2·46	2·16	1·84

Absorption of Moisture by Coke.

According to some experiments made by W. A. Selvig and B. B. Kaplan, of the United States Bureau of Mines, at the Pittsburgh Station, the hygroscopicity, especially of bye-product coke is sufficiently great to affect the results of analyses and the value of estimates based upon the analyses. The cokes tested were a beehive foundry coke and three kinds of coke from bye-product coke oven. The latter proved far more hygroscopic than the beehives coke. In an air of a relative humidity of 50 p.ct. the bye-product coke absorbed more than 1 p.ct. of moisture within one hour. After six hours there was no further increase in the amount of moisture absorbed; but a bye-product coke had absorbed 1·7 p.ct. of moisture under conditions where the beehive coke did not take up more than 0·4 p.ct. of moisture. The different bye-product coke differed as to its hygroscopicity; and, as the humidity of laboratories fluctuates considerably, the point should not be overlooked, especially in the determination of the percentage of volatile matter.

Selling Stock to Consumers.

There are many alluring features about "customer ownership" of public utilities, says Mr. R. O. Jasperson, writing in the American "Gas Record," and it takes little imagination to picture its benefits. Self-interest is the strongest interest among human beings; and with no interest whatever in their public utilities except to get service at the lowest possible price, regardless of any other consideration, it is not strange that they become willing listeners to any scheme that may seem to promise still lower rates. Let the customer, however, have some stock in the company, and everything is changed—indifference giving way to real interest. The main obstacle just now is the difficulty experienced by utilities in earning money for dividends. Recently the author had an opportunity of taking part in a customer ownership campaign in a medium-sized city where the conditions were exceptionally favourable for such an undertaking. It was decided to issue 7 p.ct. preferred stock, and to sell this to the employees and customers, either for cash or on the part-payment plan, at par. In the first place, there was a series of newspaper advertisements prepared, designed to run each day for a week before the sale started. Then two days in advance of the sale a letter was forwarded to every consumer, with a complete statement of the company's history, property, financial condition, and income account for the past seven years. A competition regarding the largest number of shares taken was arranged among the employees; and canvassers were sent from house to house to explain the whole matter to prospective buyers. Few of the calls resulted in a sale being made on the first visit; but many consumers requested to be called upon again at a later date. The best buyers were "the so-called middle class," including many mill-workers of the more sensible sort (who had not been carried off their feet by high wages), retired farmers, &c. At the end of thirteen days, the number of buyers had reached 250, with a total of $85,000 in stock; and it was expected that the total would reach $300,000. By way of warning, the author says it is better to understate than to overstate the facts. Failure to make good on every point will work infinite harm, nullifying the good effects of customer ownership.

At a meeting of the General Committee of the British Association, Sir T. E. Thorpe (formerly Principal of the Government Laboratories), Emeritus Professor of Chemistry in the Imperial College of Science and Technology, was appointed President of the Association for the Edinburgh meeting next year.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The "Betrayal" of the Gas Shareholder.

SIR,—I am, and have been for twenty years, a gas shareholder—so also my sister, brothers, father, and various other relations. Having thus written us down as a family of fools, I wish to ask you if Dr. Carpenter, in his recent public exposition of how matters now stand in the South Metropolitan Company, thinks the shareholders are perpetual fools, or that there is a "Widow's Cruse" of fools which he can always draw upon to supply him with more capital at "a favourable moment."

For twenty years I have looked on and seen my capital gradually diminish, until to-day it is worth little more than half what I paid for it; and for several years I have been fobbed-off with a 3 p.ct. dividend! All this I have borne with patience. But to patience, as also to foolishness, there comes an end; so I write to protest against this gross betrayal of the old shareholders in favour of new. Why should my dividend be limited to 5 p.ct., while new shareholders are to get 6 p.ct.?

Is this the best that the brains (?) of the various gas companies can do, notwithstanding that during the war they were supplying the Government with an enormous quantity of explosives, and that coke for export has been, and still is, fetching undreamt-of prices? To me, it seems a confession of utter inability to look after the shareholders' interests. Is there, in the kingdom, any other large commercial firm which has had Government contracts, and whose other products are fetching enormous prices, whose shares have not appreciated, and whose dividends have not increased? I think not. And now Dr. Carpenter comes forward (and, no doubt, others will follow his lead) with a *fait accompli* of 5 p.ct. for old, and 6 p.ct. for new, shareholders. Why? The minimum that old shareholders should be entitled to is an equality with the new, *plus* a payment to make-up several years' dividends from 3 p.ct. to 6 p.ct.

I am fully aware of the working of the sliding-scale, with which most of the managements of the various gas companies were so enamoured, but which most other people looked upon as an iniquity that never should have been submitted to without certain contingencies being taken into account, and which time has proved (as in the case of "co-partnership") a practical failure. But I think this only emphasizes my point that shareholders' interests are subordinated to this or that man's fads and theories, and to the foolishly onerous terms laid down by a Government Department and slavishly accepted by the gas companies as if they were "laws of nature." The sliding-scale amendment as it now stands is equivalent to a perpetual 8⅞ p.ct. excess profits duty on gas shareholders; and yet Dr. Carpenter has accepted it, and, no doubt, the various gas managements will again hug it to their bosoms as a priceless treasure!

And now Dr. Carpenter thinks he can raise more capital on a 6 p.ct. basis with another strange proviso that the unfortunate shareholder shall have an extra 2s. 6d. p.ct. dividend for every £1 p.ct. extra that could be paid—that is to say, that if a gas company should ever be in the position to pay a 14 p ct. dividend, the old shareholders will get 6 p.ct. and the new 7 p.ct. I wonder if this can be matched in the commercial history of the country? Let me tell Dr. Carpenter that the market looks upon this proviso as of negligible value, and that 6½ p.ct. or thereabouts can be obtained with absolute security of capital in Government and trustee stocks, and up to 10 p.ct. in many railway and commercial undertakings with superior security to that offered by gas companies.

I do not know if it is too late for Dr. Carpenter to get his Act amended and put upon a business basis; and I am too disgusted to inquire. In the case of other companies, it may not be too late; and notwithstanding the way Dr. Carpenter has "queered the pitch," I hope my letter may help to deter them from accepting, or agreeing to, terms that will strangle the gas industry for a generation, or until another upheaval occurs to expose their fatuousness.

In the past, the gas world has always refused to accept advice from an outsider, and has preferred to sneer and then hide its head in the sand—both at the expense of the shareholder—until the inevitable earthquake exposes it. But at the risk of sneers, and all the rest of it, I venture to offer this advice (which in ordinary commercial circles has been a truism for a great many years): "If your minimum is 10s., ask £1, and you will probably get 15s." In no case is this more necessary than in dealing with Government departments.

London, Sept. 8, 1920. ONE OF THE BETRAYED.

[Our correspondent's remarks are dealt with in an earlier part of to-day's issue.—ED. "G. J."]

Gas Industry and Benzole Production.—A statement impressing upon the Government the very serious effects of the recent increase in petrol prices has been issued by the Motor Legislation Committee, representing upwards of 200,000 owners of motors. The Committee put forward a series of recommendations, among which are the following: That all statutory gas companies having an annual consumption of not less than 5000 tons of coal be compelled to instal, within a limited period, the necessary plant for the production of crude benzole (if this were done there would at once be available a further 30,000,000 gallons of motor spirit annually). That the Government take such steps as will ensure that the output of benzole is available to the public at a reasonable price, and is in no sense controlled by the Shell and Anglo-American Oil Companies. That the Petroleum Executive be asked to consider what further steps can be taken to develop oil production in this country, and how far it may be possible for the larger consumers of coal to carbonize the coal consumed so that all the bye-products may be recovered. That facilities be provided for storing, transporting, and retailing power alcohol under regulations similar to those applicable to other types of motor spirit.

REGISTER OF PATENTS.

Furnace-Retorts.—No. 123,739.

SMITH, C. H., of Short Hills, New Jersey, U.S.A.

No. 3918; Feb. 17, 1919. Convention date, Feb. 18, 1918.

The furnace retort the subject of the present invention is said to be particularly useful in the heating of coal to reduce its volatile content, as described in patent No. 101,539. It is also applicable for use in performing the heating function of each combined furnace and retort unit described in patents Nos. 106,084 and 111,285.

The retort is provided with agitating or mixing means comprising a pair of parallel shafts, from each of which there radiate conveying and agitating paddles or blades. The shafts of this type of retort have been arranged so that the blades of one of the shafts overlap the blades of the other shafts as they rotate.

When coal is treated within a retort it reaches a stage (provided the temperature is sufficiently high) in which the coal is in a sticky or plastic condition. The coal then tends to adhere to the paddles and the shafts—that is, to the mechanism provided for conveying the coal along the retort; and unless some means are provided for removing the coal, it adheres to the mechanism and "is therefore more or less troublesome, and has a detrimental effect on the continuous operation of the furnace." With the overlapping construction, however, the paddles on one of the shafts tend to remove the coal adhering to the companion paddles and shaft.

The retort is preferably constructed so that there are a number of combustion flues immediately surrounding, or formed in, the inner wall portion of the inner shell of the retort. The requisite heat for the operation within the retort is thus supplied adjacent to the locality where the coal within the retort is treated. The innermost shell of the retort (or the circumferential wall of the retort, as it may be called) is preferably constructed of special carborundum brick in the form of hollow tile, and so will withstand intense heat. The hollow tiles are arranged so as to provide the flues just referred to in a manner similar to the hollow tile flue construction in some forms of furnaces of the rotary drum type; and they are so constructed and arranged that "they form a strong wall construction that defines the peripheral portion of the retort."

These carborundum bricks or hollow tiles are preferably surrounded by a layer of heat-storing material, as in the rotary drum type of furnace referred to. This material is preferably constituted by a relatively thick layer of fire-brick that serves the dual function of strengthening the walls that define the retort and also as a means for holding or storing heat. Surrounding these strengthening and heat-storing walls (as the layer of fire-brick may be called), there is provided a layer of heat insulating bricks—specifically sigur brick—that is, a brick of diatomaceous earth, kieselguhr, or fuller's earth—which tend to retain in the combined retort-furnace all the heat, whereby there is a minimum heat radiation.

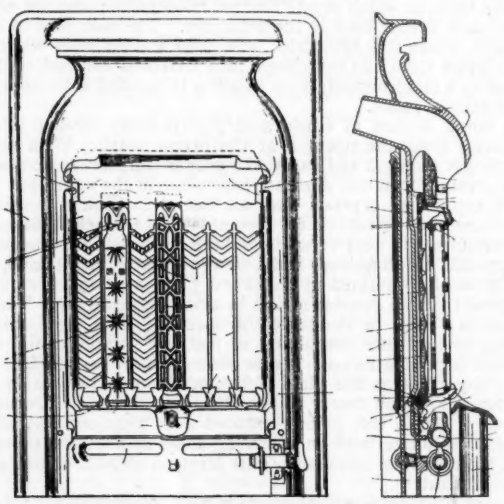
The patentee proceeds to describe his invention in a lengthy specification of nearly nine pages, accompanied by seven sheets of closely lettered diagrams—16 figures in all.

Gas Stoves, Fires, &c.—No. 148,058.

PARKINSON STOVE COMPANY, LTD., of Fitzalan Street, Kennington Road, S.E., and GIBB, D. M'C., of Edgbaston, Birmingham.

No. 20,801; Aug. 25, 1919.

This invention relates to apparatus in which gas-flames are utilized for heating rooms and the like by means of radiating refractory substances placed in the flames and/or at the back thereof, and to provide an air chamber directly at the back of the radiating portion, with inlets to the chamber for atmospheric air and an outlet or outlets from the chamber into the room it is desired to heat.



Gibb's (Parkinson Stove Company) Gas-Fire.

The improvements refer to the provision of fuel radiants and refractory slippers or carriers for the radiants which will preserve or enhance the radiating effect while permitting a metal back plate to be employed for heating the air in the chamber. The metal back plate

is constructed for utilizing as fully as possible heat at the back of the radiants, while an improved mounting of the back plate fuel rests is provided, and a refractory apron to facilitate accessibility for cleaning or other purposes.

Other features of construction embodied in the arrangement are shown by the accompanying engraving.

Gas-Heated Irons.—No. 148,670.

TOOTH, L. F., of the Commercial Gas Company, Stepney.

No. 13,577; May 29, 1919.

This type of gas-heated iron has the body divided internally by a horizontal partition or baffle so as to cause a return flow of the heated gases. The baffle consists of a plate of sheet-metal bent or curved upwardly at the rear end. The burner (of the multiple-jet type) is furnished with a T-shaped head supported from the cover within the open rear end of the iron; the horizontal limb of the T being furnished with jets adapted to play downwardly on to the base of the iron. The burner and the cover are formed with interengaging serrated parts whereby the burner is rigidly held without risk of twisting.

Treatment of Materials Capable of Being Decomposed by Heat.—No. 149,086.

DRESSLER TUNNEL OVENS, LTD., of Stoke-on-Trent, and DRESSLER, C., of Earl's Court, W.

No. 12,175; May 14, 1919.

According to this invention, the coal is caused to travel through a distillation chamber heated by one or more combustion chambers, arranged longitudinally within and at one or at each side of the longitudinal space within the distillation chamber, and adapted to heat it to different temperatures along its length so that the coal will be subjected to a process of fractional distillation—the different fractions being collected at the upper part of the chamber and drawn off separately (as far as possible) by pumps or exhausters, and delivered into different receptacles.

To keep the separate fractions apart as far as possible, the upper portion of the distillation chamber is divided by transverse walls into a number of compartments, each provided with an outlet; the lower edges of the walls being arranged to terminate as near as possible to the upper surface of the coal undergoing distillation, so as to prevent the fraction distilled within one part of the distillation chamber, at one range of temperature, mixing with those distilled within adjacent parts of the chamber at other ranges of temperature. The transverse walls are so arranged in relation to the combustion chambers as to divide the upper part of the distillation chamber into a number of compartments corresponding to given ranges of temperature in the distillation chamber and thus collect fractional distillates of approximately definite characteristics. For instance, two of the transverse walls may be so arranged in relation to the combustion chambers as to form a collecting space over the portion of the distillation chamber the temperature of which rises to, or is at, a temperature of (say) 100° to 150° C. Consequently, water vapour distilled from the coal will enter the collecting space—the next transverse wall being arranged at such a distance from the one next to it as to form a collecting space for a distillate given-off within a range of temperature of (say) from about 150° to 200° C. and so on, according to requirement.

The invention can, it is said, be advantageously applied in connection with tunnel ovens of the Dressler type, examples of which are described in patents No. 18,114 of 1910, No. 8228 of 1912, and No. 18,821 of 1913. Such ovens can be readily adapted by the provision of transverse walls or partitions in the upper part of the heating chamber or zone therein to form distillate collecting compartments or spaces of the kind herein referred to.

The heating of the combustion chambers for different degrees at different parts of their length may be effected by burners arranged at different parts of the combustion chambers in any of the ways described in patent No. 110 918. Or the combustion chamber at each side of the passageway used for traversing the coal through the oven may be divided-up into a number of successive sections independent of each other and each provided with a burner for the combustion of gaseous or other fuel.

The heating of the different longitudinal sections or the separate successive sections of each combustion chamber can be controlled to suit requirement by regulating the gas and air supply to the successive burners and by the aid of pyrometers. Each section may, by the use of several burners, be maintained at a more or less uniform and desired temperature.

The solid product of the distillation process—for instance, coke, or partly decarburized coal—will, in the case of a tunnel oven, travel through the cooling chamber or zone, when it can be cooled by the aid of fluid flowing through pipes in the chamber or zone, and the fluid thus heated by the abstracted heat utilized for any desired purpose. Thus, heat may advantageously be abstracted from the heated product within the cooling chamber and utilized for the production of steam, as described in the specification of another patent of even date with this one.

Coin-Freed Gas-Meters.—No. 149,097.

MATTHEWS, J., of Exeter.

No. 12,856; May 22, 1919.

The application of this invention is illustrated—by fig. 1, a sectional elevation of the coin-freed mechanism provided with the registering device; fig. 2, an end elevation; and fig. 3, an end elevation taken in the opposite direction, showing the registering mechanism.

Upon the fixed cam-plate A are provided two lugs, between which is pivoted a lever B having one limb extending downwardly and around the shaft of the coin holder, and formed with, or carrying, a lateral projection or cam plate adapted to protrude through an aperture formed in the plate A, in such a manner that its inner end lies adjacent to the surfaces of the fixed cam plate, and the adjustable cam plate C by which the volume of gas supplied for a single coin is determined. At the upper end of the lever B is provided a laterally projecting lug by which connection may be made with a rod D which passes through the wall of the meter and at its far end is connected to a bell-crank lever or pawl E pivoted upon a plate F, which is slidably mounted, by means of slots, upon two studs or pins G carried by a plate H, which, in turn, is supported by pins from a plate I secured in position behind an aperture in the meter-casing, and having its front face serving as a dial plate.

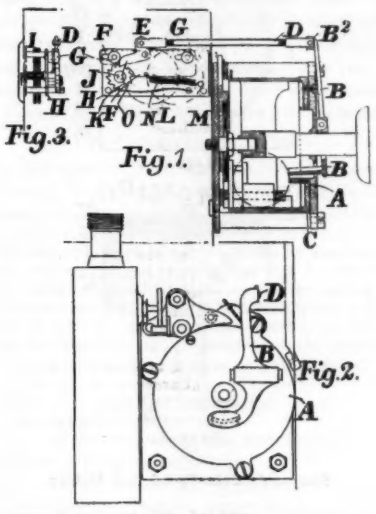


Fig. 3. Fig. 1. Fig. 2.

Matthews' Coin-Freed Gas-Meter.

The pins G are provided with collars in front of, and at the rear of the plate F, in such a manner as to permit the plate to be slidable between them. A spindle J is carried in bearings formed in the plates H and I, and projects outwardly from the former plate to receive a toothed wheel K with which the lever or pawl E is adapted to engage. Between the plates the spindle J is formed as a toothed pinion; while upon an extension which projects through the plate I is mounted an index-hand, which serves to indicate the number of coins introduced into the meter. The pinion on the spindle J is adapted to gear with a toothed wheel mounted on a spindle L, which serves to carry an index adapted to indicate shillings, while it also carries a pinion adapted to engage a wheel mounted on the spindle M which carries the index for pounds. A spiral spring N, connected at one end to a stud mounted on the plate H and at the other end to a hole in the plate F, serves to maintain the plate F, the rod D, and the lever B in the retracted position with its cam thrown forward into the coin-holder. A spring pawl O serves to prevent backward rotation of the wheel K; while a pin fixed in the plate F serves to limit the movement of the pawl E.

On the introduction of the coin into the coin-holder and the rotation of the holder by hand for the operation of the measuring nut and shaft, as the coin contacts with the cams it also oscillates the lever B upon its pivot in such manner that the rod D is thrown forward and the pawl E rotates the wheel K through one tooth—representing one division of the unit or penny index.

Coin-Freed Gas-Meters.—No. 149,117.

SIMPSON, S., of Newton Abbot.

No. 15,723; June 23, 1919.

This invention relates to coin-freed mechanism of the kind described in patents No. 22,830 of 1897 and No. 21,721 of 1911.

Fig. 1 [p. 570] shows the rotating plate—the coin-holder carrying a coin in position to rotate the plate being shown in dotted lines. Fig. 2 is a part plan view, with the coin-holder disposed in relation to the rotating plate in position for the return movement.

The pawl A is carried upon the front face of the rotating plate B by a pin or pivot C disposed in a substantially radial position and mounted in lugs D formed from the metal of the plate B in the formation of a hole E through which the pawl engages the ratchet teeth H of the measuring wheel G. The pawl—at or near the end at which the ratchet tooth H is provided upon it—has an outwardly extending arm or pin I, which protrudes into a space J reserved between the front of the plate B and the adjacent edge of the coin-holder K. The holder, in a position adjacent to the pocket or slot L for the reception of a coin M, has its edge diverted inwardly so as to form a cavity N, within which the arm I of the pawl may pass for the return movement of the coin-holder and rotating plate—the pawl A being thus permitted to pass outwardly from engagement with the ratchet teeth of the measuring wheel, and thus the use of a spring is avoided.

On the insertion of the coin and the rotation of the coin-holder for setting the mechanism to pass a determined measure of gas, the holder moves forward in relation to the pin I so that the latter passes into the space J between the front face of the rotating plate and the adjacent edge of the coin-holder; and in this position the outward movement of the pawl A for its disengagement from the ratchet teeth of the measuring wheel is not permitted—the cavity in the edge of the coin-holder coming into position only on the return movement of the holder, when the arm I is permitted to pass outwardly for the disengagement of the pawl from the measuring wheel.

The front of the pawl is provided with an extension O, the edge of which is rounded and so disposed that, should the coin-holder be returned after partial movement, the adjacent edge of the coin will

ride-over the edge and bear upon the extension of the pawl and press it, so as to lock the rotating plate B to the measuring wheel G by maintaining the engagement of the ratchet tooth of the pawl with the ratchet teeth of the measuring wheel.

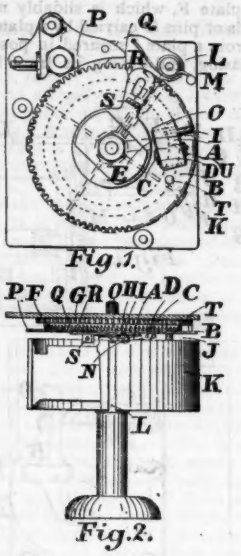


Fig. 1.

Fig. 2.

Simpson's Coin-Freed Gas-Meters.

The rotating plate B is provided with notches P corresponding to a graduated scale indicated upon it, and the radial arm or sector Q is provided with a protruding part R to engage in the notches, and thus set the radial arm or sector into any particular position on the scale. The sector is provided with a stop S, with which engages the edge of the coin on its rotation to set the mechanism. A pin T upon the rotating plate may engage with some part U of the coin holder in order that its return movement may be transmitted to the rotating plate B. In this return movement the relation of the coin-holder to the rotating plate is such that the pin I, carried by the pawl A, enters into the cavity or recess in the adjacent edge of the coin-holder as described.

Manufacture of Ammonium Nitrate.—No. 149,095.

FREETH, F. A., of Sandiway, and COCKSEDGE, H. E., of Winnington, Cheshire.

No. 12,642; May 20, 1919.

This invention relates to the manufacture of ammonium nitrate from ammonium sulphate and sodium nitrate; and the patentees give an example of the working of the process.

They say: To a solution obtained by the reaction between sodium nitrate and ammonium sulphate, having the composition (per 100 parts by weight) of 62·3 of ammonium nitrate, 10·1 of sodium nitrate, and 8·8 of sodium sulphate, there is added, after the removal of solid sodium sulphate, 7·5 parts of $CaSO_4$—the whole being stirred at about 90° C. After the reaction between the calcium sulphate and the sodium sulphate, the solution contains (per 100 parts by weight) 64·6 of ammonium nitrate, 10·3 of sodium nitrate, and 1·6 of sodium sulphate. After the removal of the precipitate of calcium, sodium sulphate, and any slight excess of calcium sulphate, the solution is cooled to 20° C., when a large crop of pure ammonium nitrate is deposited. The mother liquor remaining after the separation of the ammonium nitrate may be used again in a fresh cycle of operations.

In practice, it is naturally convenient, they say, to allow a wide margin of safety in cooling, in order to avoid the deposition of salts other than Am. nitrate. This may be done by taking a nucleus solution in which the ratio of sodium nitrate to water in the solution from which the sodium sulphate is removed is (say) three-quarters of that corresponding to saturation at the proposed temperature of cooling for the removal of ammonium nitrate, and adding sodium nitrate and ammonium sulphate to the nucleus solution, removing precipitated sodium sulphate therefrom, and adding calcium sulphate to reduce the amount of sodium sulphate in the solution so obtained.

Indicating Mechanism for Gas-Meters.—No. 149,414.

WADE, H.; a communication from J. GREENFIELD, of The Hague, Holland.

No. 11,778; May 10, 1919.

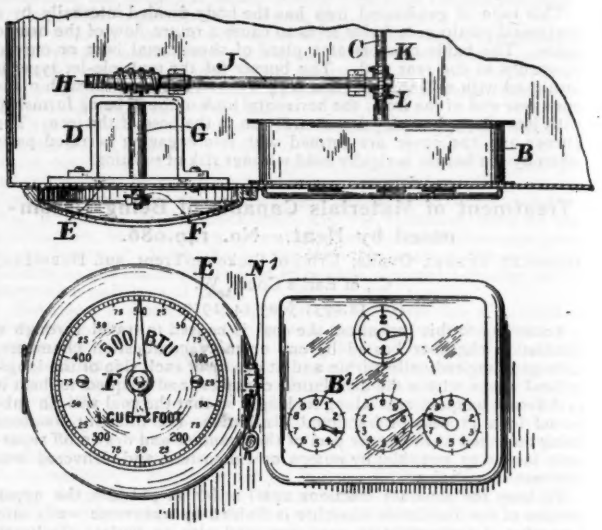
This invention has for its object to provide that the number of heat units contained in the gas that passes through a meter can be readily indicated, and such indication facilitated even when gas of various calorific values is passed through the same meter.

A top plan view shows a gas-meter partly broken away, provided with indicating mechanism according to the invention; and there is also a front elevation.

The meter comprises volumetric indicating mechanism B of any known kind, having several dials each provided with a scale graduated in cubic feet. Pointers are movable over the dials, driven in the usual manner through a train of gear-wheels by a driving spindle C, which rotates once for every 2 ft. of gas that passes through the meter.

The meter is provided with auxiliary indicating mechanism for metering the gas in heat units. This comprises a frame D mounted inside the meter on the front wall, a thermal dial E, having a scale graduated in British thermal units, and readily detachable, being secured on the outside of the front wall, and a pointer F arranged to move over the scale and detachably secured against a shoulder formed on the outer end of a spindle G journaled in the frame D.

The spindle is geared with the driving spindle C by reduction-gearing comprising a spur-gear H having 100 teeth. The wheel H is fast on the inner end of the spindle, and meshes with a worm-gear provided on the spindle J carrying a spur-gear K having 50 teeth which meshes with a worm-gear L on the spindle C. This reduction-gearing has a gear ratio of 5000 : 1.



Greenfield's Calorific Value Meter.

The thermal dial E and its pointer are protected by a glass hinged at one side to the front wall of the meter and secured at the other side by a screw and a seal. If desired, the pointer may be held by friction alone on the spindle; and it may be mounted at the rear of the dial and project round the periphery to the front. Again, the cover may be provided with a hole through which the pointer, held frictionally or otherwise on its spindle in front of the thermal dial, can be adjusted by a key specially designed for the purpose.

In the gas-meter described, the pointer F makes one revolution for every 10,000 c.ft. of gas recorded by the volumetric indicating mechanism. If the gas supplied through the meter has a calorific value of 500 B.Th.U., the scale on the dial will be preferably read from 0—500; the reading being multiplied by 10,000 to obtain the required number of B.Th.U. On the quality of the gas being changed, for example, to gas of a calorific value of 450 B.Th.U., the dial graduated to 500 can be detached from its support and replaced by one reading from 0—450. This arrangement enables the gas supplied to be readily metered in thermal units according to the quality of the gas at any time, as well as in cubic feet or other convenient volume.

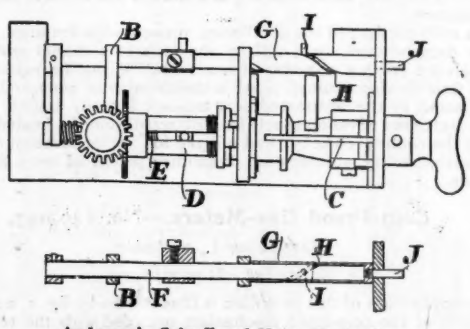
The object of providing that the pointer F can be readily returned from any part of the scale on the thermal dial back to zero is that when the calorific value of the gas is changed and one dial is replaced by another, the pointer may be returned to zero, and a new reading for the consumption of the gas of the different quality so obtained without having to alter the indicating mechanism apart from the dial and the position of the pointer. Also, the pointer can be readily set back to zero each time the meter is read, if considered desirable.

Coin-Freed Mechanism.—No. 149,469.

ANDERSON, J., of Edinburgh.

No. 13,610; May 29, 1919.

This invention is particularly applicable to gas-meters, both wet and dry, and is an improvement on patent No. 26,278 of 1910.



Anderson's Coin-Freed Meter Mechanism.

The coin-freed mechanism consists of a sleeve furnished with a spiral slot to translate the longitudinal movement of one of the differential members into rotational movement and to impart the latter movement to indicating means. It also consists in the provision of a slotted sleeve for operating the coin-indicator, carried upon a rod reciprocated

by the worm-shaft and disposed substantially parallel to the axis of the coin-carrying mechanism whereby two shafts are entailed instead of the customary three.

The mechanism shown, as regards its main parts, is substantially on the lines of the prior patent referred to above—these main parts being the base A, standards B, coin-pocket C, slotted sleeve D, and internal worm E forming the main shaft or axis, and parallel thereto a shaft adapted to operate a coin-indicating means. Instead, however, of the third shaft formed with a grooved barrel and operated by a pin I on the second shaft, there is provided a sleeve G having a spiral or like groove H cut in it engaging the pin, so that the coin-indicating pointer is secured to the end J of the sleeve so that the width of the prepayment mechanism is reduced.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Sept. 8.]

Nos. 24,950—25,571.

ANDERSON, J.—"Gas-controlling apparatus." No. 25,234.
BANYARD, H.—"Carbonization of coal." No. 25,020.
BRITISH MANNESMANN TUBE COMPANY.—"Method of jointing tubes." No. 25,256.
CURRAN, J. H.—"Retorts." No. 25,484.
DEUTSCHE KOKS-GAS GES.—"Valve control arrangement for double-acting water-gas producers." No. 25,570.
DUCKHAM, SIR A. M.—"Gasification of coal." No. 25,255.
ELIAS, O. A.—"Illuminant by incandescence." No. 25,334.
FARBWERKE VORM. MEISTER, LUCIUS, AND BRÜNING.—"Process of desulphurizing gases." No. 25,154.
FRÄNKEL, A.—"Coke-quenching device." No. 25,173.
GRACE, C. J.—"Means for governing flow of liquid through a passage." No. 25,135.
HANSFORD, J. B.—"Manufacture of neutral sulphate of ammonia." No. 25,505.
JOHNS, G. M.—"Distillation of material carrying volatile matter." No. 25,391.
JOHNS, G. M.—"Retorts." No. 25,484.
LASSEN, J. J.—"Apparatus for measuring liquids, &c." No. 25,226.
LEWIS, G. P.—"Method of carbonizing coal, &c." No. 25,151.
LOWE, F. W.—See Curran. No. 25,484.
MATHIESON ALKALI WORKS.—"Recovery of ammonia." No. 25,402.
PATTISON, E. W.—See Mathieson. No. 25,402.
TERRELL, T.—"Preparation of thoria and thorium salts." No. 25,435.
TRESCOTT, J. B.—See Curran. No. 25,484.
WOODALL, DUCKHAM, AND JONES.—See Duckham. No. 25,255.

New Joint-Stock Company.—A Company has been registered under the title of Spencer-Bonecourt, Ltd., with a capital of £120,000 in £1 shares, to acquire the business of Messrs. W. H. Spencer & Co., and the patent rights of the Bonecourt Waste-Heat Boiler Co., Ltd.

Oxford Gas Light and Coke Company.—At the annual meeting, the Directors recommended the payment of dividends for the half year to June 30 at the rate of 5 p.ct. per annum on the preference stock, and 3¾ p.ct. per annum on the ordinary stock, subject to the consent of the Board of Trade. The quantity of gas sold and used on the works during the twelve months was 453,810,900 c.ft.

Swansea Public Lighting.—The Borough Engineer referred the Swansea Corporation Highways Committee to a decision of the Council to replace the old lanterns (which had become useless during the war) by a more modern type, following which an order was placed with the Swansea Gas Light Company for 1125 lamps of the approved type, on the understanding that the consumption of gas by the new burners would not be increased beyond 4 c.ft. per hour. It now transpired that the new lamps consumed 5½ c.ft. per hour; and he reported that the additional cost in gas consumption involved for this year would be approximately £1200. The Committee agreed that the arrangement with the Gas Company should be carried out.

The Loughborough Gas Tragedy.—Evidence given at the adjourned inquest at Loughborough concerning the cases in which two men, father and son, were suffocated through an escape of gas [*ante*, p. 460] failed to clear up the mystery relating to the fracture of a disused supply-pipe, which led to the fatalities. Mr. Edward Onions (the Gas Manager) stated that no gas had been supplied to the house for fourteen years. A ½-in. gas-pipe had been originally threaded into the elbow joint. There was not sufficient pressure of gas, however, to have broken the pipe; and he considered it must have been done by force—either by a sharp blow or else a wrench. The gas which escaped would very quickly fill the whole house. The jury returned a verdict that the deaths were due to gas poisoning, and that, while it appeared certain that the breaking of the pipe was not caused by pressure of gas, there was not sufficient evidence to show how the pipe became broken.

Public Lighting Charges in Fulham.—The Highways Committee of the Fulham Borough Council report the receipt of a communication from the Gas Light and Coke Company referring to an agreement entered into in August, 1907, between the Council and the Company, and pointing out that, though the agreement was made for a period of five years, the Company have continued to supply gas and fulfilled the other conditions of the contract without increasing their charges for lighting, cleaning, extinguishing, and repairs to lamps and renewal of mantles, to meet the heavy rise in wages and cost of materials. The Company are now, however, compelled to adjust their charges to meet the altered conditions; and therefore give notice that as from Oct. 1 the charges will be increased. The Committee are advised that the increase amounts to £1 10s. 6d. per post, and on the total of 730 posts involves an increased annual expenditure of £1113, in respect of labour and materials only, not for gas. The Committee recommend that the revised charge should be agreed to.

MISCELLANEOUS NEWS.

GAS AND ELECTRICITY IN HOVE STREETS.

"Comparing" the Two Systems.

The Hove Town Council, who are owners of the electricity undertaking supplying the town, decided last autumn to instal some suspended half-watt lamps in part of the Western Road. At the same time, they gave the Gas Company permission to instal some "Littleton" six-burner gas-lamps in a portion of Church Road, so that the two systems of lighting could be compared. The two installations were completed early in the spring, and have been in use since; and the Lighting Committee of the Council have now reported upon them.

THE COMMITTEE'S REPORT.

In the main, the report of the Committee [which is commented upon to-day in Electricity Supply Memoranda] is in the following terms:

The Committee agreed that tests of the two systems should be identical, and that the illuminating power should be ascertained by means of photometer tests and close observation. The candle power of the lamps in each case is 400. As regards the test by means of a photometer, it was generally agreed that the test, after having been made, appeared to be quite useless; and the Gas Company's expert advised that the series of testings by that means should be discarded. The Committee are therefore taking for comparison the following points:

Uniformity and sufficiency of illumination.
Obstruction of posts.
Height of source of illumination.
General convenience.
Cost of the installation and maintenance.

The two sections are lighted as follows:

Electric Light.—This is carried out by fourteen half-watt lamps on a 200-volt continuous current supply, suspended over the middle of the roadway from span wires. The lamps are at a height of 22 ft. above the road surface, and 60 ft. apart.

Gas Lighting.—This is carried out by thirty six-burner "Littleton" gas-lamps on the ordinary (low-pressure) gas supply. Each lamp is carried by a hoop frame on the old lamp-standards, which have been extended to such a height that the lamps are 15 ft. above the road surface; there being fifteen lamps on each side of the road, with an average interval between lamps of about 108 ft., the intervals actually varying from 42 to 202 ft.

In making a comparison between the two systems, the Committee do not propose to go into all the technical details, but to deal with the matter generally.

The Gas Company's expert states, in his report, that "it may be accepted that fourteen gas-lamps supplied from the ordinary mains might be substituted for the fourteen electric lamps in Western Road with no appreciable difference in the illumination of the street, and with no appreciable alteration in the method of suspension or of attendance. Similarly, if electric lamps were installed on the existing lamp-standards in Church Road, the illumination of the street would be sensibly the same, though 'glare' from electric lamps at this height would be much more pronounced." The Committee are of opinion that the method shown, of suspending the electric lamps at a height of 22 ft. over the roadway, is better from every point of view than installing electric lamps on the present gas standards; and they consider that there are considerable disadvantages in attempting to suspend gas-lamps over the centre of the roadway.

As regards the extension of the present lamp-standards. To raise the lamps to a height of 15 ft. above the roadway, as shown in the gas experiment, the Committee are of opinion that this has considerable disadvantages in the main thoroughfares and bus routes, increasing the danger if these are collided with by vehicular traffic. There is, moreover, a very marked improvement in the appearance of a street when the gas standards are removed. This would be particularly noticeable in the main thoroughfare and in a busy street such as George Street.

As regards uniformity of illumination, the Gas Company are somewhat at a disadvantage owing to the fact that the lamp standards are not placed at equal intervals, and the high illumination in certain areas—for example, opposite the Town Hall. But the Committee, speaking generally, are of opinion that, apart from the statement by the Gas Company's expert that there is no appreciable difference in the illumination, electric lamps suspended over the centre of the road give a more uniform light.

On the whole, therefore, they are of opinion that electric light is the better source of illuminant.

As regards the installation and maintenance costs, the following comparative statement shows the difference between the two systems:

	Gas. Church Road.	Electric. Western Road.
1. Number of lamps erected	30	14
2. Number of separate burners	180	14
3. Capital cost of erecting	£282 7 11	£323 9 11
4. Maintenance cost per month	4 10 4	2 4 1
5. Cost for gas and electricity per hour	0 2 4½	0 1 0
6. Cost per annum for lighting of roadway	295 3 8	131 13 6
7. Cost for gas and electricity per annum, 3761 hours	£448 10 0	£188 1 0
8. Maintenance cost for twelve months	54 4 0	26 9 0
9. Total operating cost for twelve months	£502 14 0	£214 10 0

In making a comparison of the cost of the two systems, it must be remembered that the Gas Company have only charged for extending

the lamp standards in height, and have not shown anything as to the cost of the original standards and connections to the mains; while the expenditure on the electric installation is for an entirely new installation, including all costs of connection from the electricity mains to the lamps, and £35 for a tower-ladder, which would not occur again. Eliminating the cost of the tower-ladder, the capital costs were therefore: Gas, £282 7s. 11d.; electricity, £288 4s. 11d.

The above figures are taken from statistics supplied by the Gas Company and the Electricity Department respectively; and the Committee consider that they are clearly in favour of electricity. Taking the matter as a whole, the Committee are of opinion, and recommend, that the Council should inform the Gas Company that, as between the two tests, they consider the advantage lies with electric lighting.

On a report by the Electrical Engineer, the Committee considered the question of extending the overhead system of electric lighting to other roads—each lamp to cost £9 per annum for electricity and maintenance.

The Committee propose to make certain small modifications in the number of lamps to be erected, which will slightly reduce the estimated cost. They also propose to curtail the additional lighting, for which they have included a sum in the forthcoming estimate, and by so doing, and by spreading the work over a period, they will be able to carry it out without increasing the estimate. The Committee therefore recommend the Council to authorize them to carry out the work of installing overhead electric lighting in the streets named in the Engineer's report as and when the Committee are of opinion the time is most opportune, on the understanding that the estimate for the rate now under preparation will not be increased thereby.

MISLEADING FIGURES.

Upon the contents of the report being made known through the columns of the "Sussex Daily News," Mr. C. H. Rutter (the Engineer and General Manager of the Brighton and Hove General Gas Company) wrote pointing out that the figures given in the report "are misleading to those who merely glance at the financial statement." He added that "the fullest information as to the comparative costs, as well as an exhaustive report on the two systems of lighting, were submitted to the Lighting Committee; but only those portions in favour of electric lighting are allowed to appear in the Committee's report." As to the table in the report, Mr. Rutter says:

1. It will be observed that there are thirty gas-lamps against fourteen electric lamps.

3. Capital cost per lamp is:

Gas	£9 8 3
Electric	20 11 9

4. Maintenance per month per lamp:

Gas	3s. 0d.
Electric	3s. 2d.

5. Costs for gas and electricity per lamp per hour:

Gas	0·95d.
Electric	0·85d.

The comparison is unfair to gas, as the cost of electricity is taken at half the charge being made to ordinary consumers, whereas the charge for gas is at the full rate. With a fair comparison, the figures should be:

Gas	0·95d.
Electric	1·70d.

6. Cost per annum for lighting 1000 ft. of roadway. This is also a most unfair comparison, as Church Road is 30 ft. wider than Western Road. It would be much fairer to take the superficial area illuminated, because the gas lamps have to illuminate 14,133 sq. yds., whereas the electric lamps have to illuminate only 8611 sq. yds.

7. Cost for gas and electricity per annum per lamp:

Gas	£14 19 0
Electric	13 8 7

Here, again, the charge for electricity is half what it should be for fair comparison.

8. Maintenance cost per lamp per annum:

Gas	£1 16 1
Electric	1 17 8

9 Total operating costs per lamp per annum:

Gas	£16 15 1
Electric	15 6 5

The latter figure is, again, unfairly charged at the half-rate for electricity.

With the figures analyzed as above, it is difficult to understand why it is stated by the Committee that electricity is more economical than gas. It is admitted that the gas-lamps and the electric lamps are practically equal in effective illumination, and also that the Gas Company were handicapped by having to conform to the existing arrangement of lamp-columns in Church Road, so as to avoid unnecessary capital expenditure. There is no doubt that there is a larger number of gas-lamps lighted in Church Road than is actually necessary for the effective illumination of the roadway; and it would be a very simple matter to rectify this defect by altering the position of the columns at a small cost. Supposing it were ultimately decided to convert the whole of the lamps in the town to electricity at the same capital outlay per lamp as in the trial installation, the cost would be approximately £35,000; whereas the conversion to the new style of gas-lamps would cost approximately £16,000 for 1700 lamps now installed. The total cost of operating the electric lamps, as shown in the table, even at the low rate of 4d. per unit for electricity, is £15 6s. 5d. each; and yet the Electrical Engineer, in his report to the Committee, states that the proposed new lamps will cost £9 each per annum for electricity and maintenance. This statement requires verification; and it would be interesting to know by what means it is proposed to so reduce the annual cost, because the hours of lighting are to be the same as in the Western Road. At a time when every economy in the use of public money is so essential, it may be asked how the Lighting Committee can justify their action in recommending the Council to extend the use of electricity for public lighting. In addition to the fact that public lighting by gas is more economical, there is no question of its greater effectiveness as an illuminant. This fact may be left to the good judgment of the public in comparing the lighting of the two stretches of roadway.

Discussion in the Town Council.

The matter came up for discussion at the monthly meeting last Thursday of the Hove Town Council—the MAYOR (Mr. Cushman) in the chair.

Mr. PAYNE, moving the adoption of the Lighting Committee's proceedings, dealt with the various points raised in Mr. Rutter's letter. He said that first Mr. Rutter commented on there being 30 gas lights to only 14 electrics. He ignored that there were 180 gas-mantle burners as against 14 electric lights, and did not point out that these 180 were being constantly attended to and renewed by expensive labour, and that his own expert said there was no appreciable difference in the illumination. This disadvantage very materially grew against the Gas Company as one increased the number of gas-lamps. Let them take the Company's figure of 1700 lamps. This meant 1700 electric lamps against 10,200 gas lamps. The gas expert stated that, owing to the conditions in each road being different, the comparative cost must be taken per lamp of the same candle power. Moreover, the 1700 lamps would be reduced, as one electric light displaced several gas-lamps. The comparison of capital cost per lamp was misleading, because Mr. Rutter had charged only for extending 26 old gas-lamps out of 30 used, and had not shown anything for the cost of original lamps and connections; while the electricity expenditure was for an entirely new service, including connections. In those streets where the present gas columns which belonged to the Council were suitable, the gas columns could be converted to electricity, thus still further cutting-down the capital cost. In giving their figures for maintenance, neither the Gas Company nor the Electricity Department included anything for lighting and extinguishing; but as gas-lamps had to be lighted and put out individually, while electric lights could be controlled in groups from one switch, there was a further saving on electricity. It was ridiculous to say that it was an unfair comparison of cost per hour, because the Corporation did not charge so much for current as did the Company for gas. The price charged in the demonstration was the same as charged for other public electric lamps in Hove. So long as the current was not supplied at a loss, there was no reason for making a high charge for public lighting. It was interesting to note that, as regarded the experiment, if the Electricity Department charged the full price, and the Gas Company their full rate, the charge would then come to £72 8s. in favour of electricity. Mr. Rutter said this was a most unfair comparison. Let them take it then in respect of each lamp, and on his own expert's figures. He said that "each lamp might be regarded as having allocated to it for lighting a rectangular area"—gas 4400 sq. ft., electricity 6960 sq. ft. The cost as shown by Mr. Rutter for lighting 4400 sq. ft. of road with gas was £14 19s. per annum, while the cost for lighting 6960 sq. ft. with electricity was £13 8s. 7d. It had never been proposed to light all the streets in the town on the method of the Western Road experiment. The majority of streets would merely have the existing gas-columns altered to electric light, nor would those columns be altered as the Gas Company had suggested. Therefore the figures of £35,000 and £16,000 given by the Company were useless as estimates. As regarded the £9 each for current and maintenance, this figure had nothing to do with the trial scheme, but was in relation to a fresh section. The £15 referred to was an estimate; the £9 was an estimate based on actual cost. The saving they would effect by electricity in the Church Road section would pay for all the capital cost within three years.

Mr. VARLEY said the Council had previously been assured, in connection with the electricity undertaking, that the needs of the consumer were never to be subsidized out of the rates; but the idea now seemed to be to bring in the ratepayers and make them consumers and contributors to the electric light revenue. He was sorry over this attempt to get away from the principle set-up. In his opinion, the report before the Council was very misleading. Why did Westminster, the City of London, and other authorities give up electricity, and substitute gas for street lighting? The total was not given for this "little bit" the Committee proposed doing. But, as a matter of fact, it came to £1818, and to light the whole town would cost something like £40,000 under the Committee's scheme. The alternative to the two schemes was to abide by the present lighting, with which the ratepayers were perfectly satisfied. As an amendment he proposed that, "having regard to the present high cost of living, and that no request has been received by the Council from the ratepayers for an improvement in the system of street lighting, no action be taken with reference to the Lighting Committee's report."

The MAYOR: I cannot accept any resolution that is not an amendment.

Mr. LEVITA said he would second the amendment, if Mr. Varley would make it one to postpone consideration of the report for six months. This was not the time to launch-out into needless expense. The Committee's scheme must eventually cost in capital expenditure £30,000 or £40,000. He could not help noticing that certain boroughs in London had found gas cheaper than electricity. If the electricity undertaking was not theirs, would they go to it and take the lighting away from the Gas Company? He believed that the good sense of the Council would see that, in view of the financial situation, it would be wise to leave the matter alone at present, and consider it again in six months' time.

Mr. VARLEY: I agree to that.

Mr. BULL held that gas lighting in the streets gave a more evenly distributed and more efficient light than electricity, and also that the effect was more cheerful.

Alderman NYE said there was no proposal to spend a large sum of money upon substituting electricity for gas lighting throughout the town. They were going to get a light as good as, if not better than, the gas lighting at less cost. In addition they would get rid of the lamp-posts on the paths in these roads.

Mr. BRAILEY said he did most of the electric-light testing for the Committee; and with a full sense of responsibility and knowledge of the cost, he was persuaded it was the most efficient and the best light

for the streets. It was most essential that the question of electric light or gas should be settled once for all, so that the Committee could cut their cloth accordingly and provide for the future.

Mr. TRANGMAR said that at a previous meeting the Council were told electric lighting was not paying; and the cost was raised from 8d. to 10d. per unit. What was the charge here?

Mr. PAYNE: 4d. The town has always been charged a low rate for public lighting, as is general throughout the country.

The MAYOR rose to put Mr. Varley's amendment in this form: "That having regard to the present high cost of living, and that no request has been received by the Council for an improvement in the present system of street lighting, no action be taken for six months with reference to the Lighting Committee's report upon the comparative methods of street lighting."

Mr. LEVITA protested that all he seconded was that further consideration of the whole question be deferred for six months.

The MAYOR said Mr. Varley adhered to the amendment he had read, and called for a seconder. There was no reply; and the amendment fell to the ground.

Mr. LEVITA said he understood Church Road must be dealt with; but as regarded George Street, Blatchington Road, and Goldstone Street, he was prepared to move that they should be brought up for consideration at the end of six months.

Mr. PAYNE: I accept that.

Alderman NYE protested against Mr. Payne taking this course without consulting the Committee. George Street was one of the busiest streets in the town; and it was a pity it should not be dealt with now. It was a simple matter, and the removal of the lamp-posts alone would be worth the money. He proposed as an amendment that George Street should be dealt with.

The MAYOR: The effect of the amendment is that we proceed to the installation of electric lighting in Church Road and George Street.

The amendment was adopted by 16 votes to 10; and the proceedings, as amended, were then passed.

SOUTH BARRACAS GAS COMPANY.

At the Thirtieth Ordinary General Meeting of the South Barracas (Buenos Ayres) Gas and Coke Company, Ltd., which was held on Monday at the offices, No. 1, East India Avenue, E.C., the Directors presented the accounts for the year ended Dec. 31 last. In doing so, they reported that, with the sum brought forward, there was a total debit of £95,147. During 1919 the business had been kept going under greater difficulties than ever. Despite strenuous efforts, only 435 tons of coal could be obtained during the year; and gas had to be made from oil and wood—the average price paid for the latter combustible showing an increase of 12 p.ct. over the prohibitive prices paid in 1918. The result, unfortunately, was a heavier loss than during the previous year. This state of affairs was entirely due to the crisis which had prevailed in the fuel markets of the world during the period under review. Owing to the poor quality of gas produced from wood, and the decreased demand by the canning factories, there had been a serious drop in the consumption. Because of the grave news received from South Barracas, it was not deemed desirable—nor, indeed, was it possible—to borrow money with which to pay the interest on the £30,000 of first mortgage debenture stock of the Company due on Jan. 1 last. The fact that the interest could not be paid was explained to a meeting of debenture stockholders which was convened for Dec. 31. After expressing sympathy with the Directors, the debenture stockholders unanimously passed a resolution to the effect that every effort should be made to keep the business going, in the hope that the coal position might improve, and deprecating the appointment of a Receiver. Unfortunately, the coal market did not improve; and on April 7 the stockholders were again called together. At this meeting, the Trustees for the debenture stockholders and the Directors were authorized to raise £30,000 by way of prior lien debenture stock, in order to pay off pressing debts, and enable the Company to enter into a working arrangement with the City Gas Company. It had not, so far, been possible to issue the prior lien debenture stock. It was impossible to continue financing the losses which were being made; and on May 1, with the approval of the Trustees for the debenture stockholders, provisional arrangements were made with the Primitiva Gas Company of Buenos Ayres for a supply of gas, pending a definite contract being entered into for a term of years, the detailed terms of which had not yet been finally determined.

In moving the adoption of the report and accounts, which were agreed to, the Chairman (Mr. F. C. im Thurn) pointed out that the result of the year's working in South Barracas had been a loss of £25,565, which, together with interest on loans in London £8497 and interest on debenture stock £1800, made the total loss for the year £35,861. Turning to the revenue account, and comparing the figures with those of 1918, the cost of manufacture of gas was down by £6916, due to the decrease in the amount made and sold. Receipts from the sale of gas were reduced by £8329, from the same cause. It was with great regret that the Directors had to present such a poor showing for 1919, because it was always hoped that, with the cessation of hostilities, coal would not only be obtainable, but obtainable at something like normal prices. So far from this very general anticipation of events proving to be correct, the coal position had got worse and worse; and this fact was reflected in the accounts. Every effort was made to get coal, because, though the cost was high, they could have obtained a good price for their coke. But despite these efforts, and chiefly owing to coal strikes in the United States, they only managed to secure 435 tons during the whole year. The result was that, in order to keep the business going, the use of wood and oil had to be continued.

Two members of the Local Committee—Mr. H. H. Leng and Mr. F. H. Chevallier Boutell—came to this country during 1919; and the Directors were enabled to consult with them. When Mr. F. H. Chevallier Boutell returned to Buenos Ayres, he went carefully into the Company's position, and reported by cable that without coal it was impossible to keep the business going, except at a loss of about £25,000 a year, and impressed upon them the fact that if they closed-down they would lose their concessions and goodwill. This occurred early in December, 1919; and after various telegrams had been exchanged, the debenture stockholders were called together, as explained in the report. Subsequently provisional arrangements were made, whereby the Primitiva Gas Company of Buenos Ayres took over the supply of gas as from May 1, prior to making a definite contract for a term of years, the terms of which had not yet been definitely settled. The present state of affairs was entirely due to two factors—first, the effect of the war, and, secondly, the impossibility of obtaining coal. In 1914, they could purchase the best English gas coal, delivered in Buenos Ayres, for 35s. per ton; and to-day, if it was possible to buy any coal at all, it would be in the neighbourhood of £10 per ton. They could only hope that competition from oil fuel, and new avenues of coal supply, would before long reduce the present high price of coal.

THE GAS POSITION AT SHEFFIELD.

The representatives of the Sheffield Corporation on the Board of the Sheffield Gas Company, in a report to the Corporation, state that the past year's working of the undertaking shows a marked improvement on the last few years. Materials were easier to obtain; but high costs and increased wages added materially to the expenses of production.

In 1914, the total wages were less than £118,000, while in 1919 they were nearly £299,000, being an increase of £181,000, or over 2½ times as much as in 1914. In July, a further increase amounting to £26,200 per annum was granted. All these increases have to be borne by the consumer, thus adding to the cost of living, and increasing the cost of all goods in whose manufacture gas power and heat are employed. The poor quality of coal has also rendered the production of gas more difficult; but during the year the calorific standard has averaged over 500 B.Th.U. as required by Statute—though it does not appear to be generally known that the 1918 Order of 450 B.Th.U. is still in operation. There have been fewer complaints as to the quality and pressure of the gas. This reflects credit on the management generally and on the new Engineer (Mr. H. Chamberlain), who was appointed shortly after the last report.

Much work has been done in the renewal of old and the installation of new plant at all the works. New sulphate of ammonia plant is in course of erection at the Grimesthorpe works; and an experimental million unit plant on Tully's system is ordered for Neepsend, which is expected to produce a much larger quantity of gas per ton of coal, and at less cost, than any of the plants now in operation. This system occupies considerably less space than horizonal or even vertical retorts; and, if it proves as satisfactory as is expected, it may not be necessary to erect the new works at Wadsley Bridge for many years, thus saving a large capital expenditure which should if possible be avoided. The main from Orgreave Collieries for the delivery of coke-oven gas has been completed; but the Colliery Company have not yet commenced the delivery of gas as arranged.

The price of gas remains at 4s., as at the time of the last report; but owing to the special Order of last December reducing the price of coal for domestic use by 10s. per ton, a rebate of 7d. per 1000 c.ft. was made on the March and June readings of the meters, to domestic users only. During the year 1919, the total quantity of gas sold was 4,885,972,000 c.ft., being a decrease of 321,755,000 ft., or 6·17 p.ct. on the previous year. This was due to the cessation of munition work and the time required for adapting the large works to the production of their usual manufactures; but since December last the output has materially increased. The average price of gas sold was 3s. 4·86d. per 1000 c.ft., as compared with 2s. 2·79d. in 1918. The amount received for gas sold for public lamps was £12,760, as compared with £1297—an increase of £11,463, owing to the better lighting of the city.

Moving Pictures as an Educational Factor.

The use of moving pictures by gas companies as a means of educating consumers is advocated by Mr. Leon Lee in the pages of the "American Gas Engineering Journal." These pictures, he says, can be produced in such a way that the cost to an individual company will be comparatively small, while they will educate the public as no other means can; and the impression created by the moving picture is a lasting one. Recently he produced for one of the largest companies in the United States a picture which had for its object the educating of the consumers to the need for a higher rate. First of all, a more or less technical picture was tried, but with disappointing results; and then there was prepared a comedy of everyday life—all the action centring about the shutting-off of a gas supply. When the picture was thrown on the screen, there was nothing to show that it was propaganda for a company; and the audience were really pleased with it. The great gain from the gas company's point of view was that people began discussing with one another the probability of such a calamity befalling them as the shutting-off of the gas supply. Next day there were several callers at the company's office to ask whether the gas supply would, and even could, actually stop. By moving the picture from theatre to theatre, all the customers of the company were reached. Such an appeal reaches the consumer just when the public utility company are ready for it to reach him, and in the form the company may desire. Further, there is a great deal in appealing to the consumer when he or she is in a receptive mood. In addition to possessing every advantage that can be desired by the public utility company, such pictures have the added feature of entertainment.

The High Wycombe Gas Light and Coke Company, Ltd.—The profit for the past half year amounts to £920, to which has to be added £2061 brought forward and interest £55, making a total of £3037. Dividends are recommended at the rates per annum of 7¼ p.ct. on the original shares and 4¾ p.ct. on the additional shares, which will leave a balance of £1609 to be carried forward.

HASTINGS AND ST. LEONARDS GAS COMPANY.

At the recent meeting of the Company, which was presided over by Dr. G. G. GRAY, J.P. (the Chairman), the Directors reported a profit for the half year ended June 30 of £7033, which was within £24 of the amount of the authorized dividend and standing charges. The sale of gas showed a slight increase compared with the corresponding half year; and the keen demand for appliances continued. Owing to manufacturers' delay in the supply of appliances, it had been impossible to give prompt attention to orders. The increase in the cost of meters, cookers, and other appliances let on hire was such as to demand serious attention and revision of the conditions appertaining thereto. On May 12 the allowance of 10s. in respect of domestic coal was discontinued, and the price of coal increased 4s. 2d. per ton. In connection with the allowance, the sum of £8486 had to be accounted for. Of this amount, £5680 was distributed to consumers during the half year, and the balance (less authorized expenses) would be dealt with in the September quarter. To keep pace with the changes in the industrial situation and with the awards or agreements of arbitration boards, &c., the wages of employees were increased in January and again in June—the latter representing 2d. per 1000 c.ft. on the gas. The Order granted by the Board of Trade under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, would need revision, owing to the imperative further increase in the price of gas; and the necessary application had been made. The Directors recommended payment of dividends (less income-tax) at the rates prescribed by the Temporary Increase of Charges Act.

The CHAIRMAN said the past half year, like all preceding periods since the commencement of the war, had been one of increasing cost; but unlike its predecessors, it had seen the passing of two Government measures in fulfilment of long-delayed promises. As to the Gas Regulation Act, they were told that no Order would be considered until next month; and having regard to the numbers of forms that had to be gone through, it would be some time before they could take advantage of it. But the earliest possible steps would be taken by the Directors to get the benefit the Act contemplated. Reverting to the increased cost, they would find a very great difference in the past half year and the corresponding half of the preceding year. The cost of fuel showed an increase of no less than £8331, and wages a total increase of £3543. The amount expended on repairs was considerably more, due to increased cost of labour; and the same applied to purification. Rates and taxes were also higher, making a total increase in expenditure during the half year of £16,890. On the other hand, the gas rental was higher, due to the increase in the charge for gas and a slight increase in consumption. The increase was £8436, which was barely enough to cover the increase in fuel, leaving nothing to meet the increase in wages and other items. Fortunately, residual products realized much more; but this was not a normal increase, because £1000 had been paid in respect of the last half year. The total increased revenue was £17,398, leaving an increased balance of about £500. He thought the time had come when they should look back to the half year preceding the war, and compare the past half year with the corresponding period in 1914. They would find, if they did this, that fuel, &c., amounted to £20,429 in 1914 and £43,286 in the last half year, which showed that it had more than doubled, though they had manufactured a less quantity of gas. Wages in 1914 were £6878 and in 1920 £14,632, again more than double. Repairs in 1914 were £5519, in 1920 £16,237, an increase of £10,711. The total expenses in 1914 were £33,197, and in 1920 £71,251, which was more than double. These figures, he thought, showed that, so far as they were concerned, the provisions of the Gas Regulation Act were called for.

The report and accounts were adopted, and the dividends recommended were declared.

Proposing a general vote of thanks, Mr. A. W. OKE expressed his appreciation of the work of Mr. Charles F. Botley, the Engineer and General Manager.

SHREWSBURY GAS COMPANY.

The Annual Meeting of the Shrewsbury Gas Company was held on the 1st inst.—Mr. J. B. LLOYD (the Chairman) presiding.

The report presented to the meeting stated that the profit on the year's working amounted to £5803; and the Directors recommended that a dividend of 3 p.ct. be declared. An increase of 9¾ million c.ft. in the sale of gas was recorded, notwithstanding the increase in price since 1919. The cost of all materials required for the necessary repairs and renewals of plant had very considerably increased during the year, and showed no signs of abatement. In consequence of this and other burdens, the Directors had made application to the Board of Trade to allow a further increase in the price charged for gas.

The CHAIRMAN, in moving the adoption of the report, said that this year they celebrated the Company's centenary; and it was very interesting to note one or two facts in connection with its early history. The Company was formed in July, 1820, and the first dividend of 6 p.ct. was declared in 1824, on a capital of £8700. The price of coal at that time was 13s. 4d. per ton, and gas was sold at 12s. per 1000 c.ft. Today they were paying 42s. 6d. per ton for coal, and were selling gas at 6s. 8d. per 1000 c.ft. During the year under review, there had been a decrease of 14·6 p.ct. in the tonnage of coal used, owing to the replacement of old manufacturing plant by a process utilizing coke and oil. This had enabled them to give a continuous supply of gas—an achievement which would have been almost impossible had they been entirely dependent upon the supply of coal. Further modernization of plant was in progress, which, however, would not be completed before next summer, but which would then begin to effect considerable economies in manufacture. Turning to the revenue account, there was an increase of £8000 in expenditure, chiefly due to the cost of repairs and renewals of plant. The cost of coal represented 46 p.ct. of their total revenue expenditure this year. The total manufacturing costs amounted to 5s. 4¾d. per 1000 c.ft. of gas sold. Labour and materials required for every branch of repair work were a continuously increasing proportion of their expenses, representing this year over 27 p.ct. of the total. On the other hand, residuals had yielded a net return equivalent to half the cost of coal. The net profit, after deducting interest on mortgages, amounted to £4467, of which £2797 would be absorbed in payment of the dividend of 3 p.ct. which the Directors recommended; leaving a balance of £1670 to carry forward. Although this was not the full three-quarters of their standard dividend authorized under temporary legislation, the Directors felt that it was as much as they ought to recommend in view of future commitments in regard to renewals, and also bearing in mind the uncertainty in reference to prices during the current year. Anxieties in regard to matters affecting the Company's interests had in no wise diminished since the end of the war; but the Directors had faced the problems confronting them, and confidently anticipated a prosperous future for the Company, provided industrial disputes were not permitted to wreak such havoc in the business world as during the past year.

The report was adopted; and a vote of thanks was accorded to the Chairman and Directors.

In a vote of thanks to the officers and staff, special reference was made to the efforts of the Manager (Mr. C. M. D. Belton), who had worked faithfully through very difficult times. Mr. Belton, in reply, remarked that the present position of the undertaking was largely due to the loyal assistance of the staff.

THE CHELTENHAM GAS STRIKE.

Gratification at its Termination.

During the meeting last week of the Cheltenham Town Council, Mr. Yarmold expressed the grateful appreciation of the gas-workers and their wives and families at the successful intervention of the Mayor in the recent wages dispute, and added that this appreciation was also felt by gas consumers throughout the town.

Endorsing this expression, Mr. Jamieson said he thought that the Council should at the same time signify their strong disapprobation of the dilatory methods of the Board of Trade. The strike might have been settled many weeks earlier, if the Board had acted with only ordinary business celerity. It was most deplorable that a Government Department could not make up their minds upon a perfectly obvious situation without such unconscionable delay.

The Mayor (Alderman Bendall), in acknowledging the remarks, said he was all along of opinion that, once the Company's Directors and the men's representatives were got together, a settlement would be effected; and this had been the case. When he had the whole of the facts relating to the position of the Company put before him, he could not but feel sympathetic towards them. They had been working at a loss for eighteen months. To some extent, this position might have been obviated had the Board of Trade dealt earlier with their application for power to raise the price of gas. While waiting for the Board's permission, the Company went on working at a loss. The Mayor added that he had received several letters twitting them with having again "given way to the men." He did not accept this view of the matter. The men had lost, and the Directors had lost. The men were only getting what was nationally agreed to as far back as May last, and had lost five or six weeks' wages; while they would have to wait for some time for what was due to them. The public would have to pay more in future for gas.

INCREASE IN PRICE AT SOUTHPORT.

Mr. H. Ball (Chairman of the Gas Committee), in moving the adoption of the report of the Committee, at the monthly meeting of the Southport Town Council, referred to the recommendation to increase the price of gas from 4s. to 5s. per 1000 c.ft., and said he should like to give some details supplied by the Gas Engineer (Mr. John Bond). Mr. Bond said the price of gas in September, 1914, was 2s. 6d. per 1000 c.ft., less 5 p.ct. discount; so that the proposed increase to 5s. was equal to 100 p.ct. advance on the pre-war price. Gas was now selling at 4s. per 1000 c.ft., less 5 p.ct., which was below the cost of manufacture and distribution. The proposed advance was mainly brought about by the increase in the price of coal (amounting to 14s. 2d. per ton on 90 p.ct. and 4s. 2d. on 10 p.ct. of the coal used in the manufacture of gas), the advance in labour, and the extra cost of all materials essential to the production and distribution of gas. The last advance in the price of coal alone increased the yearly cost by £33,000, or 1s. 1d. per 1000 c.ft. of gas sold. The advances in the cost of administration, labour, and material other than coal amounted to approximately £22,000. The Gas Department were confronted with a total advance of £55,000, which was equivalent to an increase of 1s. 10d. per 1000 c.ft. of gas sold over and above last year's figures. The market for residual products was slightly on the increase at the present time; and if the price could be maintained, the department could look forward to an increase of 4d., leaving 1s. 6d. which was the true amount by which gas should be advanced. The Gas Committee could, however, by withholding certain work, meet the whole of their liabilities by advancing the price of gas 1s. per 1000 c.ft., as from the September quarter. This had now been made possible by the Temporary Increase of Charges Act. The advance in price should have been made at the commencement of the financial year; but unfortunately at that time gas was at the maximum price authorized. The Council would no doubt readily appreciate that, while advances on all material and labour necessary in the conduct of the undertaking had been between 140 and 400 p.ct., the price of gas had been maintained at a comparatively low figure.

Mr. Richardson said he noticed an amount "Southport Corporation Rates, £4225 4s. 4d." on the minutes. He understood that in past years it had been the custom of the Gas Committee to contribute certain amounts towards the relief of the rates; and he would like to know whether there had been any estimate as to what amount the Gas Committee would be able to contribute towards the relief of the rates next year. He greatly regretted, while recognizing the heavy advance in

the cost of manufacture, that the Committee had proposed an increase in the price of gas of as much as 1s. per 1000 c.ft. For some years past there had been a profit made out of the gas; and to his mind this had been an indirect tax on the poorer classes of the community. He objected to a profit being made out of gas, while the Electricity Estate, he took it, had been a losing proposition.

In reply, Mr. Ball said the amount £4225 4s. 4d. was not the contribution they made last year for the relief of the rates. That amount was £3200. The sum they had named to them for the present year was rather more. They thought perhaps £4000 might be given to the relief of the rates. They were sorry to have to make the increase in the price; but they had gone carefully into the matter with the Engineer, and felt they were treating the public very well.

The report of the Committee was adopted.

THE PREVENTION OF AIR POLLUTION.

The interim report of the Ministry of Health Smoke Abatement Committee [see "JOURNAL" for June 22, p. 797] is the subject of an article by Prof. J. B. Cohen, of Leeds University, which appears in the current issue of the "Journal of the Society of Chemical Industry."

For cooking, warming rooms, and providing a hot-water supply, says Prof. Cohen, the following recommendations were made by the Committee; and, in considering these, they were guided by the utility, economy, and efficiency of the proposals as regards smoke prevention. They do not recommend any one method, but make the following suggestions: That gas-cookers and gas-fires are thoroughly hygienic when properly installed; that, where an adequate supply of gas is available, a gas-cooker should be substituted for the ordinary coal-range; that for intermittent use both gas-cookers and gas-fires are often more economical than coal-fires; that from a hygienic and labour-saving point of view electric cooking and heating have much to recommend them, but the present high price of electricity precludes their general adoption. The cheapest and most efficient method of producing a supply of hot water is a coke-fired boiler. A gas-boiler, though more expensive, is very convenient in hot weather. The warming of rooms may be effected by hot-water radiators or gas-fires, both of which are quite hygienic if the rooms are adequately ventilated.

In this way, coal may be dispensed with. The system has been successfully established at the Austin Motor Company's village at Northfield, near Birmingham, where the warming of rooms by radiators and the hot-water supply were provided for by a coke-stove, and the cooking was done by gas. No coal entered the village; and no smoke issued from it. The foliage and grass retained their fresh and clean appearance; and there was no discoloration of clothes and fabrics from the fall of soot. There is, however, a difficulty in dispensing with an open fire. Custom and sentiment are not easily eradicated, and there is no doubt that the appearance of warmth is even more important to the comfort of many people than its mere sensation. But this difficulty is in a fair way of being overcome. The production of what is known as low-temperature coke, or semi-coke, or coalite, which ignites easily and glows with little or no smoke, is being investigated by the Fuel Research Board under the Department of Scientific and Industrial Research; and when this fuel is on the market at a moderate cost and in sufficient quantity, the domestic smoke problem will be near solution. Meantime, a coke-stove which can be readily lighted is being perfected by a Halifax firm, and has the advantage of being used as an open stove for warmth or closed for heating radiators or the boiler, or both, and for consuming kitchen refuse.

Hence efficiency, economy, cleanliness, and comfort can be obtained without resorting to raw coal—thus producing an enormous national saving, with pure air, clear skies, and clean foliage.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Sept.* 13.

In tar products, there is still great steadiness in the London market, but practically no change, except that the tendency of toluol and solvent naphtha is upward, in sympathy with the rise in benzole. Supplies of those spirits are limited; so that it is not easy precisely to mark the advance. Creosote is in great request; fully 1s. 3½d. per gallon net in bulk is easily obtainable.

There is nothing to report as to sulphate for home farmers.

Tar Products in the Provinces.

Sept. 13.

The average values for gas-works' products during the week were: Gas-works coal tar, 120s. 6d. to 125s. 6d. Pitch, East Coast, 215s. to 217s. 6d. per ton f.a.s.; West Coast—Manchester, 186s. to 190s. 6d.; Liverpool, 186s. to 190s. 6d.; Clyde, 186s. 6d. to 190s. 6d. nominal. Benzole 90 p.ct. North, 2s. 6d. to 2s. 7d.; crude 65 p.ct. at 120° C., 1s. 10d. to 2s. naked at makers' works; 50-90 p.ct. naked, North, 2s. 4d. to 2s. 6d. Toluol, naked, North, 2s. 6d. to 2s. 7d. nominal. Coal tar crude naphtha in bulk, North, 11½d. to 1s. Solvent naphtha, naked, North, 3s. to 3s. 2d. Heavy naphtha, North, 3s. 4d. to 3s. 6d. Creosote, in bulk, North, liquid, 1s. to 1s. 0½d.; salty, 11½d. to 1s. Heavy oils, in bulk, North, 1s. to 1s. 0½d. Carbolic acid, 60 p.ct., 3s. 11d. to 4s. Naphthalene, £40; salts, £9 to £9 10s., bags included. Anthracene, "A" quality, 1s. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

The market generally is very uncertain, in view of the possibility of a coal strike; and neither buyers nor sellers have any definite ideas as to how they should act. If the strike is averted, it is more than likely

"Entente" fitted in grate.

MAIN'S "ENTENTE" FIRE.

TO SUMMARIZE the main factors in the success of the "Entente" Inset Gas Fire:—

All unnecessary Iron Work is completely eliminated.

The Gas brick is accurately blended to the back brick of the Grate.

The Trivet neatly fits the front of the Grate and affords ample Reflecting Surface.

The Fire is most elastic in construction and suits the Grate equally well fixed either on the Hearth or on any height of Bottom Grate.

It is no Patchwork but a component part of the Grate to which it is fitted.

Both Burner and Injector are constructed on essentially new principles embodying the latest Main Patents and produce an absolutely silent and intense Flame.

R. & A. MAIN, LTD.,

WORKS: Gothic Works, EDMONTON, N.18; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.
SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W.1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 6, Narrow Wine Street, BRISTOL; 333, Queen Street, MELBOURNE.

that by this time top prices have been seen for the main products. On the other hand, a strike would create a serious and immediate shortage in most products. Pitch is as scarce as ever, and prices continue to advance. Over £11 has been paid in South Wales, and about the same figure in London; but in the North rather under this price is being quoted. Crude tar is dearer; and creosote continues very firm. The actual price quoted for the latter does not seem to have changed; but the general feeling is that higher prices are quite likely if fuel costs generally continue to advance. Apart from this, there seems to have been a large consumption of both pitch and creosote on the roads lately. Solvent naphtha is quiet; but some small advance is being looked for, if only in sympathy with the greater value of the other spirits. Heavy naphtha has not changed. Naphthalenes are hardly offered, and prices spoken of almost impossible. Refined flake is reported at £63; but offers of £60 would probably secure moderate quantities. Crudes, too, are scarce, with £16 paid now for lowest quality. Up to £26 is offered for better sorts; and it is reported that £30 has been paid for highest quality. Carbolic acid has once again fallen to the position of being the weakest section of the trade. Cresylic acid also is lower.

The range of quotations is as follows:

Benzole: 90% London 2s. 5d. to 2s. 7d., North 2s. 4d. to 2s. 6d.; 50-90% 2s. 3d. to 2s. 4d. London, 2s. 2d. to 2s. 3d. North; crude 60-65%, 1s. 6d. to 1s. 8d.; pure, 4s. per gallon naked.

Crude Tar: London, 105s. to 110s.; Midlands, 102s. 6d. to 107s. 6d.; North, 100s. to 105s. per ton *ex* works. Refined tar, 85s. per barrel (free) on rail.

Pitch: London, 220s. per ton f.o.b.; East Coast, 215s. per ton; West Coast, 205s., with Manchester 200s. per ton, and Glasgow 210s. per ton; South Wales, 222s. 6d. per ton.

Solvent Naphtha: London, 2s. 11d.; Provinces average 2s. 9d. per gallon.

Crude Naphtha: Naked, 10d.; North, 9d. per gallon.

Heavy Naphtha: 3s. 6d. per gallon.

Naphthalene: Refined flake, £60 per ton nominal; inferior, £35; crude, £16 to £30 per ton, according to quality.

Toluol: Naked, 2s. 11d. per gallon nominal. North, 2s. 9d. Pure, 4s.

Creosote: London, 1s. 1½d. to 1s. 2½d.; North, 1s. 1½d.; heavy oil, 10½d. per gallon in bulk.

Anthracene: 40-45%, 9d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Pyridine: 20s. to 25s. per gallon.

Aniline Oil: 1s. 11d. per lb., drums extra.

Aniline Salts: 2s. 2d. per lb.

Cresylic Acid: 95%, 4s. 9d. to 5s. 3d.; 97-99%, 5s. 6d. to 5s. 9d. per gallon *ex* works London, f.o.b. other ports.

Carbolic Acid: Crude 60%, 3s. 6d. per gallon; crystals 40%, 11d. per lb.

Salicylic Acid: Technical, 2s. 7d.; B.P., 3s. 3d. per lb.

Xylol: Pure, 6s. 9d.; commercial, 5s. 9d. per gallon.

Sulphate of Ammonia.

There is very fair inquiry on home account, and business should increase from now onwards. Exports, however, are drooping, and prices are rather lower. Official prices have been increased 3s. 6d. per ton to cover recent increases in railway rates. In America, sulphate of ammonia continues scarce in most quarters, and brokers report difficulties in securing offers. Some resale lots are in evidence; but buyers are not much interested on account of high prices prevailing.

Price of Gas in Manhattan.

As the result of a suit brought by the Consolidated Gas Company of New York, it has been declared that the then existing 80c. gas-rate was confiscatory and unconstitutional; and a new rate of $1.20 per 1000 c.ft. has been authorized, to take effect immediately. A trustee has been appointed for all the money collected as the difference between the old and the new rate; the additional 40c. per 1000 c.ft. to be held until some competent "rate-making authority" shall prescribe a new rate—this authority being given until March 1, 1921, in which to enact such regulations. If the decree is reversed by the United States Supreme Court, or if a competent authority promulgates a new gas-rate prior to the date named, the additional 40 c. per 1000 c.ft. is to be refunded to the consumers provided a reduction to this extent is ordered on the $1.20. If no new rate is made, the Gas Company will take the whole of the impounded money. The valuation of the Company's property is $77,000,000; and the $1.20 per 1000 c.ft. rate has been fixed by the Court because it will enable the Company to receive a return of 8 p.ct. upon this valuation. The income on the old basis represents a return of only 1·2 p.ct.; the net cost of delivering gas, based upon the working of 1918 and the first eight months of 1919, being $75·18 c. per 1000 c.ft. "We in this country," said the Judge, "are not only influenced by conditions in Europe, but we are subject to our own local inflation and disorganization of industry, from which no one can know when we shall recover." The plaintiffs are faced with a condition which permits them to receive much less than the return which the Statute contemplated. This condition, although probably not permanent, is bound to extend over a period of some years—at least, in coal, oil, and labour, which are the principal costs of the Company.

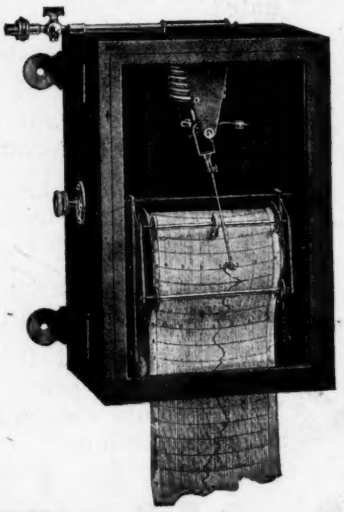
Airdrie Street Lighting.—Last year the Airdrie Town Council reorganized their street lighting, discarding electricity and replacing it with high and low pressure gas-lamps. The low-pressure lamps were all fitted with "A. & M." patent pressure-wave automatic controllers. When finished, there were 416 in all. As the system proved highly successful, the Town Council now propose to extend it to all back court and private lamps, of which there are 240 in all. This, indeed, is very complimentary to this system of street gas lighting, which has been installed under the supervision of Mr. Archibald Kellock, the Gas Engineer and Manager.

SIMMANCE'S DEAD BEAT RECORDER

TAPE CHART PATTERN

For Pressure or Vacuum.

NO LIQUIDS USED.



The chart roll is renewed 6 times a year.

The record can be torn off at any interval.

Lowest Range: 0-2 inches water.

Highest Range: 0-300 lbs. per sq. inch.

Suitable for Gas, Air, Water, or Steam, and may be used on Crude Gas.

MAKERS:

ALEXANDER WRIGHT & Co., Ltd., WESTMINSTER

British Gas Light Company.—At the half-yearly general meeting of the Company on the 29th inst., the Directors propose to recommend, subject to audit, a dividend, for the six months ended June 30, at the rate of 10 p.ct. per annum, less income-tax, and payable in October.

Strike Precaution at Knaresborough.—In view of the threatened coal strike, the Knaresborough Urban District Council have decided that the town shall be only partially lighted at present, in order to economize coal; and that full lighting shall not be renewed until a settlement of the dispute is assured.

Main Extension at Ossett.—At a meeting of the Ossett Gas Committee, the Gas Manager (Mr. A. E. Mottram) submitted tenders received for the supply and laying of an 8-in. steel main in connection with the taking of gas from Crigglestone; and he also submitted an estimate of the cost of carrying out the work by direct labour. He was instructed to do the work by direct labour, at an estimated cost of £14,290.

Cost of Dublin Lighting.—The Dublin Corporation last week adopted a recommendation of the Committee of the Whole House giving instructions to various departments to effect savings in the current year's expenditure totalling over £150,000. As affecting the Lighting Department, the savings will amount to £15,000; and it is feared that in this, as in other departments, the result will be serious in its bearing on the character of the service given to the public.

Redcar Gas-Works Change Hands.—At the time arranged, on Saturday, the 4th inst., the Redcar Gas-Works became the property of the Urban District Council, under the Act passed last session. In the Board-room at the works, the formal transfer took place. Councillors Wardman and Hill, with the Clerk (Mr. R. M'Lean, J.P.) waited upon the Directors, and handed over a cheque for £117,995. Mr. A. O. Cochrane, J.P. (the Chairman) congratulated the Council on the purchase, and wished them every success. The Council are giving the shareholders of the Company who leave their money in the undertaking 7½ p.ct. for the first twelve months. At a special meeting of the Council, Mr. H. Clapham (Engineer and Manager under the Company) was, after an interview, appointed to act in a similar capacity for the Council.

Eastbourne Gas Company.—Addressing the shareholders at the recent meeting, the Chairman (Mr. Caleb Diplock) referred to the loss sustained by the death of their Chairman, the late Mr. J. C. Towner, who had been connected with the Company for 23 years. Speaking of the financial position, he said the revenue account showed a profit for the half year of £5392. In regard to the price of gas, it was now 5s. 4d. per 1000 c.ft., against 2s. 6d. in 1914, an increase of 110 p.ct., which was much lower than the increase in the cost of living. Dividends were declared for the half year at the rate of £3 16s. 3d. p.ct. per annum upon the "A" stock, £2 12s. 6d. upon the "B" stock, and 5 p.ct. upon the preference stock. A resolution that the Directors be paid £1200 for the year was passed.

The Metric System.—In a report submitted by the Metric Committee appointed by the Conjoint Board of Scientific Societies, on the compulsory adoption of the metric system in the United Kingdom, it is recommended that the British system of units be retained in general use in the United Kingdom. As to measures of length, the abolition of the pole, furlong, and league is advocated, as well as the limitation of the link and chain to use in the determination of area. Among other suggestions are the abolition of the grain, dram, stone, quarter, hundredweight of 112 lbs., the peck, bushel, quarter, chaldron, and barrel; that the use of the metric system be made compulsory with as little delay as possible in the whole trade in fine chemicals and drugs, and in all specifications and prescriptions relating to such products; and that, so far as coinage is concerned, no change in the existing system be attempted in present circumstances.

A letter from the National Union of General Workers was read at a meeting of the Plymouth Gas Committee protesting against the retention of women to collect money from the slot-meters. It was stated that steps were being taken to employ men for the purpose.

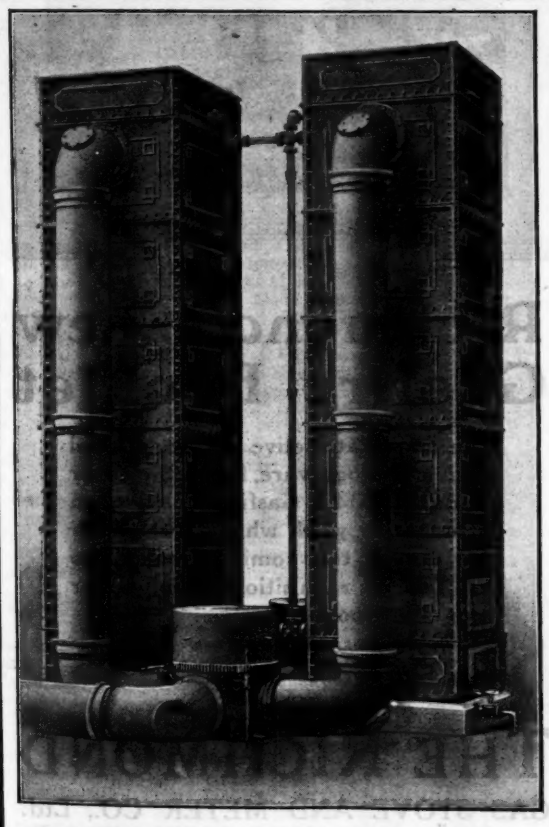
The Patent Office Library is open to the public daily except on Sunday, Good Friday, Christmas Day, Whitsun Eve, and Bank Holidays. On and after Oct. 1, the hours will be from 10 a.m. to 9 p.m., except on Christmas Eve and Easter Eve, when the Library is closed at 4 p.m.

Messrs. Falk, Stadelmann, & Co.'s seasonal advertising campaign in connection with "Veritas" mantles is again taking the form of posters on the street-hoardings; and to the already well-known designs there is about to be added another which it is confidently believed will prove as arresting as its predecessors.

Messrs. Firth Blakeley, Sons, & Co., Ltd., of Leeds, forward an illustrated leaflet drawing attention to plant they have provided for gas and chemical works, coke-oven and bye-product works, oil refineries, &c. One of the photographs shows a busy corner of the firm's North-Eastern Railway sidings at Church Fenton.

Mr. John Methven, late Engineer of the Bromley-by-Bow Gas-Works, has entered into partnership with Mr. E. J. Cossey as engineers' agent. The firm are in a position to supply all stores, tools, sundries, and plant, and having had over thirty years' gas-works' experience, have good knowledge of what materials are required. They are also London agents for the "Algæ Jell Boiler Fluid." Their new business address is No. 3, Cursitor Street, Chancery Lane, E.C. 4.

Considerable damage to the apparatus contained therein resulted from a fire early last Friday in a signal-box at Crewe Station, which is one of the largest electrical signal-boxes in the world. Much delay to traffic ensued, for the signals covering all trains entering Crewe Station were put out of action, and the points could not be moved. All the telephonic and telegraphic installation was also destroyed. The fire was apparently caused by the fusing of a wire.



"BEARSCOT" TUBING IN WATER CONDENSERS EXTENDS UPWARDS OF 130 MILES.

WATER-COOLED CONDENSERS

AS FITTED WITH THE "BEARSCOT" SAFE JOINT TUBE.

With our Central Port Fourway Valve the Condensers may be Reversed or Bye-passed as Required.

PARTICULARS WILL BE SUPPLIED UPON APPLICATION TO—

R. & J. DEMPSTER, LD.

Telegrams: "Scrubber Manchester"

MANCHESTER.

LONDON OFFICE:
34, VICTORIA STREET, WESTMINSTER, S.W.1.

Australian Gas Light Company.

The one hundred and sixty-ninth half-year's report of the Directors of this Company—presented at the general meeting of the proprietors held in Sydney on the 9th ult.—pointed out that the net profits for the half year to June 30, including the balance brought forward, amounted to £95,878. The Directors recommended the payment of a dividend for the six months of 4 p.ct. on the old "A" and "B" shares, and in proportion on the new "A" shares, which would absorb £80,692, and leave a balance to be carried forward of £15,186. It was added that the balance of the new issue of shares (20,000) was submitted to auction in terms of the Gas Act on April 21 last, and disposed of. The Directors reported with regret the resignation from the Board of Mr. G. E. Fairfax, owing to an extended visit abroad. Mr. James Moir has been appointed to the vacancy. As intimated in the last half-yearly report, the "B" and "C" debentures which matured in January and February were re-issued with a currency of five years as from the latter date, bearing interest at the rate of 6 p.ct. per annum. Of the total amount (£800,000), the sum of £61,700 has not yet been taken up, and is still available for the public as an investment. Among the business before the meeting was to consider the following resolution which a shareholder had given notice that he intended to move: "Until the Company in general meeting shall otherwise determine, the Directors shall be paid out of the funds of the Company, by way of further remuneration for their services, the yearly sum of £750, to be divided among them as they may decide."

Maryborough Gas and Coke Company, Ltd.—The profit of this Queensland Gas Company for the half year ended June 30, after making provision for bad debts, repairs and renewals, depreciation, and working expenses, and including the balance brought forward, amounted to £1252. Of this the dividend recommended, which was at the usual rate of 6 p.ct. per annum, free of income-tax, absorbed £1237.

Powers of Charge at Newport (I.W.).—The Newport (I.W.) Town Council have received a letter from the Board of Trade as to the Council's objections to the application by the local Gas Company for an Order under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, stating that the Board were advised that the increased price asked for by the Company would be not more than sufficient to enable them to pay a dividend of 3¾ p.ct. upon their ordinary capital; and that after careful consideration of the circumstances of the case, the Board had made an Order fixing the price which the Company might charge to consumers at 6s. per 1000 c.ft. For the information of the Council, a copy of the Company's reply to the Council's objections was enclosed. It was decided to invite the Manager of the Gas Company to attend the next meeting of the General Purposes Committee, on the question of the defective supply and quality of gas in the borough.

The Crowle (Doncaster) Urban District Council have accepted the offer of the local Gas Company to supply gas for the lighting of the street-lamps during the winter, at 8s. per 1000 c.ft.

Scarborough Corporation workmen are applying for an increase of £1 per week in wages; and the Salaries and Wages Committee have been authorized by the Town Council to receive a deputation of the men on the subject.

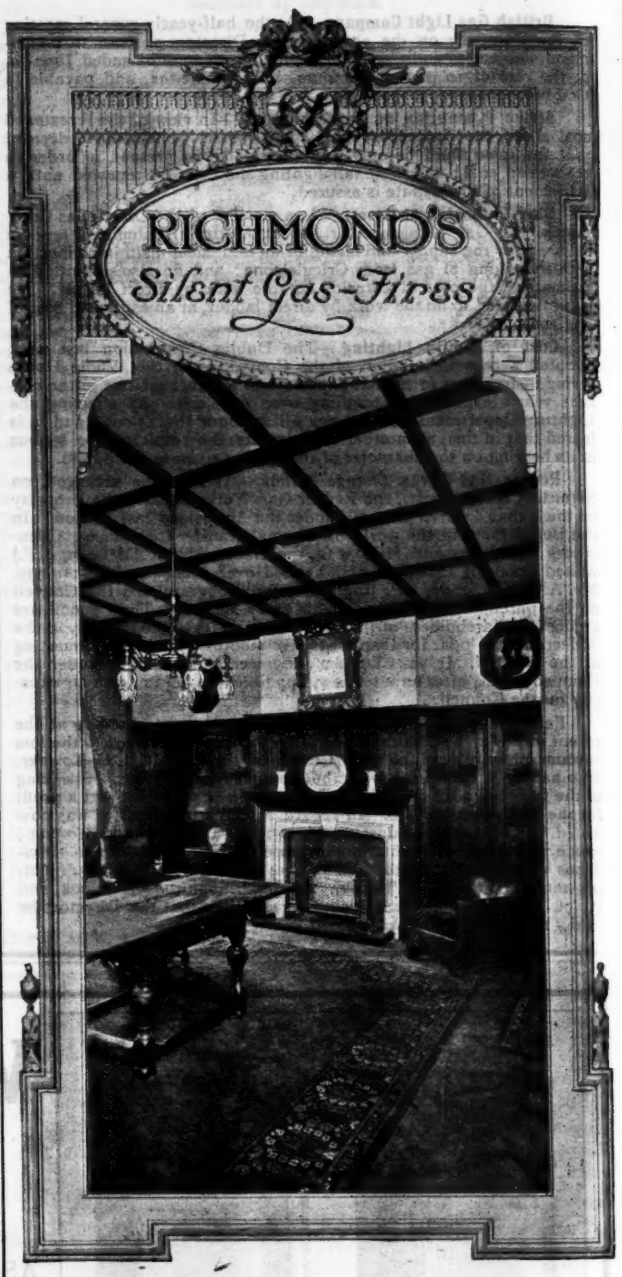
The Penistone and Thurlstone Urban District Councils have decided to make a combined protest to the Board of Trade against the application of the Penistone and District Gas Company for power to increase the maximum price of gas from 5s. to 7s. per 1000 c.ft.

During a performance at the Sunderland Theatre Royal, the electric lights were extinguished owing to the fusing of a cable in the street. The emergency footlights, which were in readiness during the war in case of air-raids, were speedily brought into use; and the performance continued by means of the gas and a number of candles.

The United States Producers' Refining Company have secured thousands of acres of oil-bearing shale, and are arranging to begin immediately extensive operations in shale development. One plant in California is working, and ten additional plants of 5000 tons capacity are to be built at different points in the west. Tests have shown that the Company's shale runs to approximately 50 gallons per ton.

Applications are invited by Messrs. Major & Co., Ltd. (who carry on business as refiners and distillers of coal tar and petroleum products and manufacturers of "Solignum" wood preservative) for 100,000 8¼ p.ct. cumulative preference shares of £1 each and 60,000 ordinary shares of £1 each. The Company own freehold works at Hull and Wolverhampton, and long leaseholds of works at Chesterton and Dagenham; while they have recently acquired freehold premises and works at Saltney. Other works are owned by subsidiary Companies in which Messrs. Major & Co. hold 95 p.ct. or upwards of the issued capital. The Company have tank storage for nearly 7 million gallons of liquid products, and control tank-wagons with a carrying capacity of 250,000 gallons. The business was established in 1857.

Successful trials were performed by the s.s. "Brockley," built by the Dublin Dockyard Company, Ltd., to the order of the South Metropolitan Gas Company; this being the fifth vessel the firm has built for the same owners. The "Brockley" is of the flush-deck type, with machinery amidships, and has two holds, each free from obstructions, served with four extra large hatchways. She is fitted with a cellular double bottom, large fore and aft peak tanks, and also a deep tank aft for water ballast. The machinery, consisting of a set of triple expansion engines, two boilers, and up-to-date auxiliaries, has been supplied by Messrs. J. G. Kincaid & Co., Ltd., of Greenock. The Dublin Dockyard Company have also launched the s.s. "Jetblack," the second steamer built by them for the Gas Light and Coke Company. As with the "Brockley," everything has been arranged to ensure good passages in light and loaded conditions during heavy weather. In this case also Messrs. Kincaid & Co. were responsible for the machinery.



Richmond's new Gasfire Booklet

The above attractive design, printed in rich Photogravure, forms the cover of our 1920-21 Gasfire Booklet, an advance copy of which will reach you during the coming week. Do not fail to requisition supplies for your Showroom.

This List contains particulars of new and attractive designs, also a further development of the "R.H.D." (Radiant Heat Distributor) semi-circular fronted fire.

THE RICHMOND

GAS STOVE AND METER CO., Ltd.

London Offices & Showrooms . . 164-172, Queen Victoria St., E.C. 4
Works . . Warrington.

Coke and Gas Ovens, Ltd., have purchased the "Still" patents and processes, covering coke-ovens, the recovery of bye-products and benzole.

An example of what the increased railway rates mean has been afforded by Mr. A. J. Harrison, the General Manager of the Accrington Gas-Works, who stated that the higher rates for carriage, &c., will involve his Board in an additional annual expenditure of £5000.

Reference was made in the Nelson Town Council to a recommendation increasing the salary of the Gas Engineer (Mr. James Mitchell) from £746 to £850 per annum, £328 to be regarded as war bonus. Alderman Fell said the Committee had not been guided altogether by the Civil Service award. They thought their Engineer was worthy of the increase. Other corporations were paying high salaries. Mr. Campbell moved the minute back, on the ground that it was out of all proportion to the increased cost of living. There was, however, no seconder, and the recommendation was approved.

The Thirsk Gas Company are offering by tender a new issue of £3000 6 p.ct. preference shares of £10, redeemable at par 1930-35.

Robert Kirk, a confectioner of Hull, committed suicide by gas poisoning. He was found dead, with a tube to his mouth connected with the gas bracket, and the gas turned on.

The new "Veritas" mantle factory of Messrs. Falk, Stadelmann, & Co., at Garratt Lane, Wandsworth, S.W., is now in full swing. It is equipped with the latest machinery and appliances for the manufacture of "Veritas" mantles—many of the machines possessing special features, and having been made in the firm's own engineering shops. The increased facilities provided by these new works will ensure adequate supplies of mantles; and the fact that the technical direction of the factory is in the same hands as have been responsible for the manufacture of "Veritas" mantles for many years past, will doubtless ensure that the high standard of quality which has made them so popular will be fully maintained.

STOCK MARKET REPORT.

THE general run of things on the Stock Exchange last week showed an improvement—not so much in the volume of business, for cautious moderation was still the order of the day, but in the tone of markets. These were sustained by very hopeful views that the national tragedy of a coal strike will be averted by the common sense of the people.

The gilt-edged group was mostly steady. Home Government issues closed rather better, Friday's figures being: Consols 45⅝-46½, War Loan 84⅝-85⅛, Funding 67¼ 67⅝. Victory 75-75⅜. Bonds were in good demand; but Corporation issues eased. Home Rails were very quiet. Canadians and Argentines were irregular.

The Foreign Market was in better case. French, Japanese, Brazilian, and Mexican were fairly well supported; but Russian and Greek were not.

In Miscellaneous, Rubber was dull; but Oil was firm.

A welcome change came over the Gas Market; and it suddenly awoke to life and action with a recognition (albeit partial and not minutely accurate) of the benefits to be conferred by recent legislation. On Wednesday, there was a general rise throughout the list, and further advances followed later on. Prominent among these were Gas Light, South Metropolitan, and Commercial, Brentford, Lea Bridge, South Suburban, and Tottenham. It is noteworthy that in some instances where capital issues were advanced the debenture issues were lowered. In Alliance and Dublin, both issues not unnaturally gave way. Imperial Continental was firm, both issues advancing. Primitiva and River Plate debentures were weaker.

Bargains done for cash during the week were as follows: On Monday, Bombay 4½, Brentford "B" 46, 46½. Commercial 4 p.ct. 52, Gas Light ordinary 52, 52½, 53, 53½, 54½, ditto maximum 39, ditto preference 54½, Imperial Continental 128, 129, 129½, 130, 131, ditto debenture 83¼, Monte Video 73, 73½, Oriental 98, 99½, 100, Primitiva preference 25s., ditto debenture (1911) 40½, South Metropolitan 57, 59 59½, 60, 61. On Tuesday, Alliance and Dublin, 47, European 7½, Gas Light ordinary 53½ 54⅝, 56, 58, ditto maximum 39, ditto 10 p.ct. bonds 132, 133, Imperial Continental 130, 131, 131⅛, 132, ditto debenture 84, 84½, Oriental 99, River Plate debenture 40, South Metropolitan 60, 62⅜ 62⅞, 62, Bath Consolidated ordinary 63. On Wednesday, Alliance and Dublin 38, Brentford "A" 47, ditto "B" 46, 48, British 22, Gas Light ordinary 57, 58½, 59, 59½, 60, 60½, 61, ditto maximum 40½, Hastings and St. Leonards 3½ p.ct. 38⅝, 39, Imperial Continental 130, 131½, 131⅝, Monte Video 71⅛, 72, Oriental 99½, Primitiva preference 22s. 6d., 28s. 9d., ditto debenture 69⅛, 69⅝, 69¾, 70, River Plate debenture 39, 40, South Metropolitan 62½, 65, Tottenham "B" 52½, 53½. On Thursday, Brentford "B" 49, ditto debenture 60, 60½, Gas Light ordinary 59, 59½, 59⅝, 59¾, 60½, Imperial Continental 131⅜, 132, Monte Video, 70¼, 71½, South Metropolitan 63, 63½, 64⅜, 65, South Suburban 62, South California 5 p.ct. preference 100, 100½, Crowborough district 30. On Friday, European 7 7/16, 7½, Gas Light ordinary 58, 59, 60, 60½, ditto maximum 40, Imperial Continental 130, 130½, 131, 131¼, 131⅜, 131½, 132, 132½, South Metropolitan 64, 64⅜, 65, South Suburban debenture 68, 68¼.

In the Money Market, the condition was extremely variable, frequently changing in the course of the day; but the predominant character was firmness. Discount rates ruled harder. Silver hardly moved. The Bank rate is 7 p.ct., as fixed on April 17.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 27	4	4%	Aldershot 4 p.c. Pref. .	...	56—61*	...
1,551,868	,,	Mar. 26	2½	3⅛%	Alliance & Dublin Ord.	59—64	38—43	38—47
374,000	,,	July 14	4	4%	Do. 4 p.c. Deb.	76—79	47—52	...
280,000	5	May 13	7½	8%	Bombay, Ltd. . . .	5½—6½	4½—5	4½
50,000	10	Aug. 12	16	5%	Bourne-mouth Gas and Water { 10 p.c. . .	29—30	8½—8¾	...
383,110	10	,,	7	7%	B 7 p.c. .	15—15½	8½—9	...
115,000	10	,,	6	6/-	Pref. 6 p.c.	13½—14	7½—8½	...
162,065	—	June 25	—	4%	4 p.c. Deb.	...	62—64	...
992,045	Stk.	July 14	14	30/-	Brentford A Consolid. .	261—266	50—55	47
734,920	,,	,,	11	26/3	Do. B New . .	204—209	47—52	46—49
55,000	,,	,,	5	5%	Do. 5 p.c. Pref. .	109—111	68—73	...
221,400	,,	June 10	4	4%	Do. 4 p.c. Deb. .	91—93	60—63	60—60½
214,775	,,	Aug. 27	11	7½%	Brighton & Hove Orig. .	208—213	120—125*	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	78—83*	...
1,287,500	Stk.	July 29	5	5%	Bristol 5 p.c. max. . .	...	...	...
530,000	20	April 14	12½	10%	British	44—45	22—24	22
120,000	Stk.	June 25	4	4%	Do. 4 p.c. Deb. Stk.	88—90	57—59	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	42—45	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1½—2½	7—7½	...
100,000	10	,,	—	4½%	Do. 4½ p.c. Pref. .	4—6	5½—6½	...
100,000	Stk.	June 25	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	56—61	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord. . .	108—110	...	...
1,513,280	,,	Aug. 12	5/9/4	30/-	Commercial 4 p.c. Stk.	106—108	52—57	52
560,000	,,	,,	5½	26/3	Do. 3½ p.c. do.	103—105	47—52	...
475,000	,,	June 10	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	45—47	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	27—32	...
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	40—60	...
51,600	,,	Aug. 27	14½	10½%	Croydon A 10 p.c. . .	...	125—135*	...
278,400	—	,,	11½	7½%	Croydon B and C 7 p.c.	..	85—95*	...
492,270	Stk.	—	6	5%	Derby Con. Stk. . .	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk. .	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd. . . .	17½—18	6½—7½	7½—7½
16,298,975	Stk.	July 29	4/17/4	30/-	Gas 4 p.c. Ord. . .	98—102	57—62	52—61
2,600,000	,,	,,	3½	26/3	Light 3½ p.c. max. .	76—79	40—45	39—40½
4,062,235	,,	,,	4	4%	and 4 p.c. Con. Pref.	96—99	55—58	54½
4,674,850	,,	June 25	3	3%	Coke 3 p.c. Con. Deb.	72½—74½	45—48	...
130,000	,,	Dec. 11	10	10%	10 p.c. Bonds. .	...	...	132—133
82,500	,,	Mar. 11	5	3½%	Hastings & St. L. 5 p.c.	...	55—60	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	38—43	38½—39
70,000	10	May 13	11	8%	Hongkong & China, Ltd.	16½—16¾	8½—9½	...
86,600	Stk.	Mar. 11	9	5½%	Hornsey 7 p.c. . . .	...	88—93	...
131,000	,,	Aug. 12	7½	4½%	Ilford A and C . . .	151—154	84—89	...
65,780	,,	,,	6½	3½%	Do. B	115—118	64—69	...
65,500	,,	June 25	4	4%	Do. 4 p.c. Deb. . .	92—94	55—58	...
4,940,000	,,	May 14	9	4½%	Imperial Continental .	150—160	129—134	128—132½
1,235,000	,,	Aug. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	82—87	83¼—84½
235,242	,,	Mar. 26	6½	5%	Lea Bridge Ord. 5 p.c. .	119—121	82—87	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. { A.	211—213	...	...
					{ B.	146—148		...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,736	,,	Aug. 12	7/5/6	3½%	Maidstone 5 p.c. . .	...	52—57	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4½—4¾	1½—2½	...
250,000	100	April 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	89—96	...
541,920	Stk.	May 27	4	6%	Monte Video, Ltd. . .	11½—12	70—75	70½—73½
1,875,892	,,	July 29	4½	3½%	Newcastle & Gatsh'dCon.	98½—99½	60—61	...
529,705	,,	June 25	3½	3½%	Do. 3½ p.c. Deb.	82—83	50—51	...
15,000	10	Mar. 11	—	8%	North Middlesex 10 p.c.	...	13—13½	...
55,940	10	,,	7/14/0	5%	,, ,, 7 p.c.	14—15	7½—8½	...
300,000	Stk.	May 13	8	8%	Oriental, Ltd. . . .	117—122	98—101	98—100
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd. . . .	7½—7¾	2—3	...
60,000	50	Aug. 27	13	7½%	Portsea Island, B . .	128—131	65—70*	...
100,000	50	,,	12	6½%	Do. C . .	118—121	50—55*	...
249,980	5	April 29	8	—	Primitiva Ord. . . .	5½—6	⅛—⅜	...
499,960	5	June 26	5	—	Do. 5 p.c. Pref. .	4½—5	1½—1¾	22/6—28/9
521,600	100	June 1	4	4%	Do. 4 p.c. Deb. .	91—93	69—71	69½—70
600,000	Stk.	July 29	4	4%	Do. ,, ,, 1911	...	40—42	40½
346,198	,,	June 25	4	4%	River Plate 4 p.c. Deb.	85—87	38—43	39—40
150,000	10	Mar. 26	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	6½—7½	...
125,000	50	July 2	5	5%	5 p.c. Deb.	47—49	38—40	...
135,000	Stk.	Aug. 27	10	5%	Sheffield A	223—224	68—73	...
209,984	,,	,,	10	4%	Do. B	222—224	58—63	...
523,500	,,	,,	10	3½%	Do. C	220—222	53—55	...
133,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c. . .	...	...	...
90,000	10	June 25	9	9%	South African . . .	10½—11½	11—12	...
6,609,895	Stk.	Aug. 12	5/4/0	30/-	South Met. 4 p.c. Ord..	111—113	61—66	57—65
250,000	,,	July 14	—	5%	Do. Pref. . .	...	91—93	...
1,805,445	,,	,,	3	3%	Do. 3 p.c. Deb..	72½—74½	45—47	...
224,820	,,	Aug. 27	8½	5%	South Shields Con. Stk.	157—159	95—96*	...
1,087,795	,,	July 29	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	62—67	62
247,538	,,	June 25	5	5%	Do. 5 p.c. Deb. Stk.	116—118	68—73	68—68½
647,740	,,	May 13	7½	3½%	Southampton Ord. . .	99—102	57—60	...
121,275	,,	June 25	4	4%	Do. 4 p.c. Deb. Stk.	...	59—61	...
120,000	,,	Aug. 12	—	3½%	Tottenham { A 5 p.c. .	135—138	60—65	...
782,275	,,	,,	6	2½%	District { B 3½ p.c. .	115—117	52—57	52½—53½
181,255	,,	June 10	4	4%	{ 4 p.c. Deb.	87—89	60—63	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd. . . .	5—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
236,476	Stk.	Mar. 11	5	3½%	Tynemouth 5 p.c. max.	108½—109	71—73	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Aug. 27	8½	47/6	Wandsworth A 5 p.c.	151—156	75—80*	...
255,636	,,	,,	6½	32/6	Do. B 3½ p.c.	129—134	50—55*	...
108,075	,,	,,	—	33/3	Do. C . . .	...	50—55*	...
140,865	,,	,,	—	33/3	New Ordinary . . .	...	50—55*	...
352,000	,,	,,	6½	26/3	Wimbledon 5 p.c. . .	117—122	43—48*	...
98,000	,,	,,	6½	32/6	Epsom 5 p.c. . . .	121—126	50—55	...
88,416	,,	June 25	3	3%	3 p.c. Deb. Stk. . .	66—69	44—47	...

*Ex Div.

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NATIONAL ASSOCIATION OF TECHNICAL GAS OFFICIALS.

NEWCASTLE-UPON-TYNE APPOINTMENT OF CHIEF ENGINEER.

INTENDING Applicants for this Position are notified that the Executive of this Association have informed the Gas Undertaking concerned that, in their opinion, the Remuneration Offered should be stated, and have requested them to re-advertise the Position offering remuneration in conformity with the Association's Scale for this size of Undertaking—namely, a commencing Salary of £1750 per Annum, rising by three annual increments of £300 odd, to £2675 at the end of Three Years.

Failing re-advertisement, intending Applicants are advised not to apply for, or to accept, the Position under any circumstances.

(Signed) General Secretary,
N.A.T.G.O.

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E. SALTER DAVIES,
Director of Education.

Sept. 9, 1920.

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THE Directors are prepared to re- ceive Applications for the Position of CHIEF ENGINEER.
Applicants must be Competent Engineers, capable of Designing and Superintending the Erection of Modern Manufacturing and Distributing Gas Plant, and be familiar with the Working of the same; and also be capable of Managing and Controlling the various Works of the Company.
Applications, stating Qualifications, Experience, Age, Salary required, and References, to be addressed to the Chairman of the Company, and received not later than Sept. 20, 1920.

T. P. RIDLEY,
Secretary.

Gas Offices,
Market Street,
Newcastle-upon-Tyne.

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APPLICATIONS are invited for the Position of CHIEF ASSISTANT to the DISTRIBUTING ENGINEER and SALES MANAGER. Commencing Salary (inclusive of Bonus), £500 per Annum.
Applications, by letter only, stating Qualifications, Experience, Age, &c., to be addressed to the DISTRIBUTING ENGINEER and SALES MANAGER, at the Company's Offices, Katherine Street, CROYDON.

WANTED, by North of England Gas Company, a CHEMIST with Gas-Works Experience.
Applications, stating Age, Qualifications, and Salary required, to No. 6974, care of MR. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

REQUIRED by a Leading Oil Firm a REPRESENTATIVE to call on all Gas-Works in the United Kingdom.
Only those with First-Class Connections need apply to BOX 4540, c/o DAWSON'S, 121, CANNON STREET, E.C. 4.

WANTED—Smart Energetic Young MAN as Ordinary METER SURVEYOR and COLLECTOR.
Apply, with References, stating Experience and Salary required, to R. D. HUNTER, Gas Offices, NEWARK.

GAS-Fitters Wanted—Must be well up in Compo Work, and able to Fix Meters, Cookers, Gas-Fires, &c. Wages £4 12s. 7d. per week—47 Hours.
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RECRUITS required. — Hydrogen Workers. Age 18 to 28, ex-Service men 38. Good Pay and Exceptional Opportunities of Advancement.
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FOR SALE (separately or otherwise), Second-Hand, Four "Silva" Indoor Shop or Institute LAMPS, complete with Three Burners, in Good Condition—1919 make.
Write PETTINGILL, 1A, Bartlett's Terrace, Rockmount Road, PLUMSTEAD, S.E. 18.

FOR SALE.—One Set of 3 Throw Ver- tical Geared PUMPS, by Tangyes, having C.I. Plungers 5 in. diam. by 8 in. Stroke, Fast and Loose Pulleys, 2 in. Suction and Delivery; one ditto, 4 in. Plungers by 6 in. Stroke; one ditto, Phosphor Bronze Lined, 4 in. Phosphor Bronze Plungers by 6 in. Stroke, with Fast Pulley. All with Air Vessels.
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ONE Boiler Tank, 18 ft. long by 5 ft. 6 in. diam.; two 16 ft. long by 5 ft. diam.; one 15 ft. by 6 ft. diam.; one 10 ft. by 4 ft. diam.; and one 6 ft. by 2 ft. 9 in. diam.
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HYDRAULIC Accumulator, Cylinder 8 ft. long, Ram 4 ft. long by 8 in. diam. for 15 Ton Weights. Set of 2-Throw Pumps, 1½ in. diam. Steel Rams by 1½ in. Stroke with Fast and Loose Pulleys, &c. All by Hollings and Guest.
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SET of 3-Throw Belt-Driven Hydraulic PUMPS by Smith and Co., Glasgow, having 1½ in. diam. Gun Metal Rams by 6 in. Stroke, with Fast and Loose Pulleys. Several Sets of Double and Single Ram Pumps in Stock.
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COKE-Oven Gas for Town Lighting. PRODUCER GAS PLANT for Low-Grade Fuel, Heating of Ovens, and Displacement of Coke-Oven Gas.
Communications to WALTER CHANEY, Eldon Street House, Eldon Street, LONDON, E.C. 2.

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Send full Particulars and Price now to No. 6977, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

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Full particulars and price to SUMMERS' CARBONIZING SYNDICATE, LTD., Glapwell Colliery, near CHESTERFIELD.

PATENT NOTICE.

THE proprietor of British Patent No. 22061/13, dated Sept. 30, 1912, relating to "GAS WATER HEATER," is desirous of entering into arrangements by way of Licence or otherwise, on Reasonable Terms, for the purpose of Exploiting above Patent and ensuring its Practical Working in Great Britain.
All inquiries to be addressed B. SINGER, 29 So. La Salle Street, CHICAGO, Illinois.

CONTRACTS OPEN.

THE Warrington Corporation Gas Department are prepared to receive TENDERS for:
(1) STRUCTURAL IRONWORK for Coal Store Roof and Railway.
(2) HYDRAULIC TIPPING RAMS.
Tenders to be in not later than Sept. 20.
For further Particulars apply to the Longford Gas-Works.

W. S. HADDOCK,
General Manager.

CORPORATION OF CALCUTTA.

NOTICE TO CONTRACTORS.

TENDERS are invited, in Duplicate, for the Supply and Delivery of 2882 One-Light 15-inch SQUARE COPPER STREET LANTERNS, constructed from strong Copper sheets throughout (unpainted), which must be made specially Insect and Dust Proof, Porcelain Reflectors complete, with Scroll Irons, without Ladder Bar and Three Set Screws. These Lanterns must be of suitable size for Single Inverted Incandescent Gas Burner consuming about 3½ to 4 cubic feet per hour; and the Tops of the Lanterns should be hinged. Separate prices to be quoted for ⅜th inch Brass Adaptation Fittings (Seamless Tube) with Unions complete, also 21 oz. Best Quality English Glass Panes for the above Lamps.
Samples of the Copper Lanterns (unpainted) should be forwarded (carriage paid) for Inspection to the Superintendent of Stores, Calcutta Corporation, 149, Lower Circular Road, Calcutta.
Tenders must include Cases and Packing, also delivery Free of all Charges at the Corporation Stores; all articles to be Insured against Breakages and Marine Risks. Delivery must be Completed in July, 1921. Payment will be made for each consignment when Delivery is accepted in terms of the Contract, which a successful tenderer is required to execute within two months from the acceptance of his Tender.
The Corporation do not bind themselves to accept the lowest or any Tender, and will be at liberty to accept the whole or part of a Tender. No Tender will be considered unless accompanied by a remittance to the extent of 2½ per cent. on the total value of such Tender. All rates should be quoted both in words and figures; and the Tender should remain open for acceptance for three months from the date of opening the same. Tenderers must abide by the rules in regard to Tenders which are in vogue in the Corporation.
Each Tender, in duplicate, must be enclosed in a sealed cover and superscribed "Tender for Copper Street Lanterns." Tenders will be received by the Deputy Chairman up to 2 p.m. on Monday, the 22nd November, 1920, when they will be opened in the presence of such Tenderers as may be present. Tenderers may submit their Offers on their own Forms.

J. C. MUKERJEA,
Secretary to the Corporation.

Central Municipal Office,
Calcutta,
Aug. 13, 1920.

COMPANY NOTICE.

BRITISH GASLIGHT COMPANY, LIMITED.

NOTICE is Hereby Given, that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at the Chief Office, No. 11, George Yard, Lombard Street, in the City of London, on Wednesday, the 29th day of September, at Twelve o'clock noon precisely, to receive the Report of the Directors and the Statement of Accounts for the Half Year ended June 30, 1920; to declare a Dividend; to elect Two Directors; to appoint Two Auditors; and to deal with any business that may be legally transacted at an Ordinary General Meeting.
NOTICE IS HEREBY ALSO GIVEN that the TRANSFER BOOKS of the Company WILL BE CLOSED from the 14th inst. to the 29th inst.

By order of the Court of Directors,
A. W. BROOKES,
Secretary.

Chief Office: No. 11, George Yard,
Lombard Street, London, E.C. 3,
Sept. 13, 1920.

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BY DRIVING YOUR AUXILIARY PLANT ELECTRICALLY

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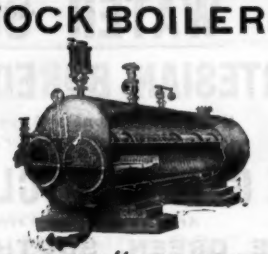

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Two	30 ft. 0 in. × 8 ft. 3 in.	× 100 lbs. W.P.
One	30 ft. 0 in. × 8 ft. 3 in.	× 120 lbs. W.P.
Four	28 ft. 0 in. × 7 ft. 6 in.	× 160 lbs. W.P.
Two	28 ft. 0 in. × 7 ft. 6 in.	× 130 lbs. W.P.
Three	28 ft. 0 in. × 7 ft. 3 in.	× 160 lbs. W.P.
Eight	24 ft. 0 in. × 7 ft. 3 in.	× 120 lbs. W.P.
Four	28 ft. 0 in. × 7 ft. 3 in.	× 160 lbs. W.P.
Two	28 ft. 0 in. × 7 ft. 3 in.	× 120 lbs. W.P.
One	23 ft. 6 in. × 7 ft. 3 in.	× 160 lbs. W.P.
One	24 ft. 0 in. × 6 ft. 6 in.	× 120 lbs. W.P.

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ONE TENTH THE SPACE, ONE HALF THE COST OF "OLD STYLE" WET METER.

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W. J. JENKINS & CO., LTD.
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See Advertisement last week.

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PITCH A SPECIALITY.

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ARTESIAN BORED TUBE WELLS,
Norton's Patent "Abyssinian" Tube Wells.
Deep Well Pumps and Patent Air Lift Pumps.
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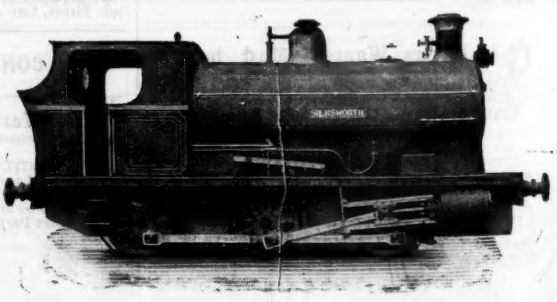

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